

INSTRUCTION MANUAL

# MODEL 132

## VCG/NOISE GENERATOR



# WAVETEK





# **MODEL 132**

## **VCG/NOISE GENERATOR**

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Manual Revision: 10/81  
Instrument Release: U-10/80

# WARRANTY

All Wavetek instruments are warranted against defects in material and workmanship for a period of one year after date of manufacture. Wavetek agrees to repair or replace any assembly or component (except batteries) found to be defective, under normal use, during this period. Wavetek's obligation under this warranty is limited solely to repairing any such instrument which in Wavetek's sole opinion proves to be defective within the scope of the warranty when returned to the factory or to an authorized service center. Transportation to the factory or service center is to be prepaid by purchaser. Shipment should not be made without prior authorization by Wavetek.

This warranty does not apply to any products repaired or altered by persons not authorized by Wavetek, or not in accordance with instructions furnished by Wavetek. If the instrument is defective as a result of misuse, improper repair, or abnormal conditions or operations, repairs will be billed at cost.

Wavetek assumes no responsibility for its product being used in a hazardous or dangerous manner either alone or in conjunction with other equipment. High voltage used in some instruments may be dangerous if misused. Special disclaimers apply to these instruments. Wavetek assumes no liability for secondary charges or consequential damages and, in any event, Wavetek's liability for breach of warranty under any contract or otherwise, shall not exceed the purchase price of the specific instrument shipped and against which a claim is made.

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## SCOPE OF MANUAL

This manual contains instructions for operating, testing, and maintaining the Wavetek Model 132 VCG/ Noise Generator. The Wavetek product-improvement program ensures that the latest electronic developments are incorporated into the Wavetek instruments by the addition of circuit and component changes as rapidly as development and testing permit. Due to the time required to document and print this manual, it is not always possible to incorporate these changes into the manual. In this case, data will be found on engineering change sheets at the back of the manual. If there are no change sheets, the manual is correct as printed.

## SCOPE OF EQUIPMENT

The Model 132 is a source of analog and digital noise, as well as a precision source of sine, triangle and square waveforms. Noise outputs, or waveforms can be used individually, or combined to provide selectable, calibrated signal-to-noise and noise-to-signal ratios to +60 dB. Waveforms can be varied over a frequency range of 0.2 Hz to 2 MHz. Length of the digital sequence is selectable to a maximum of  $2^{20} - 1$  bits. Clock rates, variable from 160 Hz through 1.6 MHz, give added versatility to the noise generator. These clock rates allow selectable noise bandwidths variable from 10 Hz to 100 kHz.

## **SAFETY**

This instrument is wired for earth grounding via the facility power wiring. Do not bypass earth grounding with two wire extension cords, plug adapters, etc.

BEFORE PLUGGING IN the instrument, comply with installation instructions.

MAINTENANCE may require power on with the instrument covers removed. This should be done only by qualified personnel aware of the electrical hazards.

WARNING notes call attention to possible injury or death hazards in subsequent operations.

CAUTION notes call attention to possible equipment damage in subsequent operations.








# SECTION 1

## SPECIFICATIONS

### VERSATILITY

#### Waveforms

Sine , square , triangle  waveforms and analog noise , or digital noise 




#### Frequency Range of Signal

0.2 Hz to 2 MHz in 6 decade ranges

#### Ranges

X10	0.2 Hz to 20 Hz
X100	2 Hz to 200 Hz
X1K	20 Hz to 2 kHz
X10K	200 Hz to 20 kHz
X100K	2 kHz to 200 kHz
X1M	20 kHz to 2 MHz

#### Function Outputs

Sine , square , and triangle  selectable, with 60 dB step attenuator in 10 dB steps and overlapping calibrated vernier; 50 $\Omega$  output impedance, 20 V p-p into open circuit and 10 V p-p into 50 $\Omega$  load from 50 $\Omega$  source impedance.

#### Sync Output

Greater than 1 V p-p square wave into open circuit at 600 $\Omega$  output impedance.

#### DC Offset

$\pm 5$  V offset ( $\pm 2.5$  V offset into 50 $\Omega$  load) controlled from rear panel; peak amplitude limited by the dynamic range of the amplifier output.

#### VCG — Voltage Controlled Generator

Frequency of the generator may be dc-programmed, or ac-modulated by external 0 to  $\pm 5$  V signal. Voltage control circuitry is capable of 1000:1 deviation. The VCG amplifier has a 100 kHz bandwidth and a slew rate of 0.1 V/ $\mu$ s. The instantaneous frequency is the result of the sum of the dial setting and the externally applied voltage.

#### Stability

Short term  $\pm 0.05\%$  for 10 minutes  
Long term  $\pm 0.25\%$  for 24 hours  
Percentages apply to amplitude, frequency, and dc offset.

### HORIZONTAL PRECISION

#### Dial Accuracy

$\pm 2\%$  of full scale, 1 Hz to 2 MHz

#### Frequency Vernier

One turn equals 1% of full scale.

#### Time Symmetry

$\pm 1\%$  through X100K range

### VERTICAL PRECISION

#### Sine Wave Frequency Response

Amplitude change with frequency less than:

0.1 dB from 0.2 Hz to 200 kHz

0.5 dB from 0.2 Hz to 2 MHz

### PURITY

#### Sine Wave Distortion

Less than:

0.5% on X10, X100, X1K, X10K ranges

1.0% on X100K range

All harmonics 30 dB down on X1 MHz range

#### Square Wave Rise and Fall Time

Less than 50 ns terminated into 50 $\Omega$

### NOISE

#### Outputs

Pseudo-random analog or digital noise with a maximum of 20 V p-p excursion (open circuit) with 60 dB step attenuator in 10 dB steps and overlapping calibrated vernier.

#### Sequence Lengths

Push buttons on the front panel provide a sequence length of  $2^{10} - 1$ ,  $2^{15} - 1$ , or  $2^{20} - 1$ .

### Noise Clock Frequency

Switch selectable noise frequencies are listed below.

Clock Frequency	Analog Noise Bandwidth
160 Hz	10 Hz
1.6 kHz	100 Hz
16 kHz	1 kHz
160 kHz	10 kHz
1.6 MHz	100 kHz

### OPERATIONAL MODES

**FUNC** Function Mode — Provides the selected waveform at the main output.

**S/N** Signal-to-Noise operation adds noise to a selected signal of constant amplitude. The signal-to-noise ratio is variable from 0 to +60 dB.

**N/S** Noise-to-Signal operation adds a selected signal to a constant amplitude noise. The noise-to-signal ratio is variable from 0 to +60 dB.

**FM** Frequency Modulation — Provides random modulation of the frequency of the generator. The S/N - N/S (dB) ratio control also controls the amount of frequency deviation.

#### NOTE

*When noise is added to the signal output, specifications apply up to 200 kHz and the square wave rise time is derated by a factor of 10. In the clock range of 1.6 MHz, the maximum calibrated signal-to-noise ratio is 30 dB.*

### ENVIRONMENTAL

#### Temperature

All specifications listed, except stability, are for 25°C  $\pm 5^\circ\text{C}$ . For operation from 0°C to 55°C, derate all specifications by factor of 2.

### MECHANICAL

#### Dimensions

8½ inches wide, 5¼ inches high, 11½ inches deep

#### Weight

8 lbs net, 12 lbs shipping

#### Power

105 V to 125 V or 200 V to 250 V, 50 Hz to 400 Hz.  
Less than 15 watts.

#### NOTE

*All specifications apply for frequencies obtained when dial is between 0.1 and 2.0 and at 10 V p-p into a 50 ohm load.*

*It is possible to stop the generator from oscillating by applying a negative VCG voltage when the dial is already set at minimum frequency. VCG inputs up to 30 V will not permanently damage the instrument.*



# SECTION 2

## OPERATION

### INSPECTION

The following procedures should be performed to assure the user that the instrument has arrived at its destination in satisfactory operating condition. Complete calibration and checkout instructions are provided in Section 4 to determine compliance with electrical specifications.

#### Checking Visually

After carefully unpacking the instrument, visually inspect the external parts for damage to knobs, dials, indicators, surface areas, etc. If damage is discovered, file a claim with the carrier who transported the instrument. Retain the shipping container and packing material for use in case reshipment is required.

#### Checking Electrically





#### NOTE

*Instruments are normally shipped connected for 115 V power unless 230 V power is ordered. Refer to the end of this section for conversion instructions.*



The steps in this paragraph provide a quick checkout of the instrument operation. If electrical deficiencies exist, refer to the WARRANTY in the front of this manual. The following test equipment is recommended for performing this electrical inspection:

Name	Required Characteristics
Oscilloscope	To 30 MHz
Plug-In	Dual channel
Plug-In	Peak mV measuring capability
Counter-Timer	To 2 MHz with 5-digit resolution

1. Turn FREQ HZ selector to the X1K position. (This connects ac power to the unit and establishes the frequency multiplier.)

2. Depress MODE — FUNC push button.
3. Connect oscilloscope to the 50 $\Omega$  OUT connector with a 50 $\Omega$  terminator.
4. Set frequency dial to the 1.0 mark and FREQ VERNIER to CAL position.
5. Set function selector to the  position.
6. Set OUTPUT ATTEN (dB) and OUTPUT VERNIER (dB) to maximum clockwise (cw) position (no attenuation).
7. Check for 1 kHz sine wave with at least 10 V p-p amplitude on oscilloscope.
8. Select  and  with function selector and check for 10 V p-p amplitude on oscilloscope.
9. Turn frequency dial from maximum counter-clockwise (ccw) to maximum cw position and check for frequency change.
10. Step OUTPUT ATTEN (dB) selector through its range and verify attenuation at each step.
11. Rotate OUTPUT VERNIER (dB) control from maximum cw to maximum ccw position and check for decreasing amplitude.
12. Rotate FREQ VERNIER control and check for frequency change.
13. Set FREQ VERNIER control at maximum cw and frequency dial at 0.02. Set frequency to 20 Hz with counter. Connect a 0 to +5 Vdc input to the VCG IN connector. Slowly increase voltage input from 0 to +5 V and check that frequency of output waveform increases from approximately 20 Hz to 2 kHz.
14. Depress SEQUENCE LENGTH 2<sup>10</sup> — 1 push button.
15. Set NOISE FREQ HZ selector to the 16K/160K position and vernier control fully cw.
16. Connect a BNC cable from the NOISE SYNC connector (rear panel) to the external trigger input of the oscilloscope.
17. Rotate the function selector to  and check to assure oscilloscope displays digital noise.
18. Check to assure SEQUENCE LENGTH push buttons vary the bits in the sequence length.
19. Step NOISE FREQ HZ selector through its range and check to assure clock frequency changes. (Use NOISE CLOCK connector on rear panel.)



20. Verify that NOISE FREQ HZ vernier control provides approximately 10:1 variation in clock frequency at the NOISE CLOCK connector (rear panel).
21. Rotate function selector to  position and check to assure oscilloscope displays analog noise.
22. Check to assure SEQUENCE LENGTH push buttons vary the length of the sequence of analog noise. (Use NOISE SYNC connector on rear panel.)
23. Connect oscilloscope external trigger cable to FUNCTION SYNC connector (rear panel) and set function selector to  position.
24. Set S/N — N/S (dB) selector to —10 position and vernier control fully ccw.
25. Depress MODE — FM push button and check to assure square waveforms are frequency modulated by analog noise.
26. Release MODE — FM push button and depress MODE — S/N push button. Check to assure square wave and analog noise are mixed.
27. Depress MODE — N/S push button and rotate S/N — N/S (dB) selector ccw through each position, checking for reduction in signal level.
28. Verify that the S/N — N/S (dB) vernier attenuates the signal approximately 10 dB between each step of the S/N — N/S (dB) selector.






## OPERATING CONTROLS

The operating controls and electrical connections for the Model 132 are shown in Figures 2-1 and 2-2. Each of the following paragraph numbers corresponds to a number appearing in Figure 2-1, front panel, or Figure 2-2, rear panel. The listing below discusses each control and its function.







### FRONT PANEL

1. **FREQ HZ/PWR OFF** — Selects one of six decade ranges from X10 to X1M for generator frequency. This value multiplied by the frequency dial setting (3) gives the output frequency of the generator. Extreme ccw rotation will place the switch in the PWR OFF position, turning off all power to the function and noise generators. This control has no effect on the noise frequency.
2. **FREQ VERNIER** — Allows precision electronic control of the signal output frequency. A full turn of the control is approximately equal to 1%

of full scale. When turned to the full cw position (CAL), settings on the main dial will be calibrated.

3. **Frequency Dial** — Allows coarse control of the signal output frequency.
4. **Frequency Index** — Indicates the frequency dial setting (3) by reading the dial position opposite the scribe line on the frequency index. The index is illuminated when power to the unit is on.
5. **Function Selector** — Selects the desired function or noise output. To select , , or  waveforms, or  or  noise, the FUNC push button (7) must be depressed.
6. **OUTPUT VERNIER (dB)** — Provides vernier control of 0 through —20 dB from the OUTPUT ATTEN (dB) setting (12). This is the fine adjustment for the output signal and will attenuate signal and noise.

### MODE

7. **FUNC** — When depressed, this control allows the selected waveform or noise, as determined by the position of the function selector (5), to be present at the 50 $\Omega$  OUT connector (11). This push button must also be in the depressed position for the frequency modulation mode (10).
8. **S/N** — Depressing this push button allows a calibrated amount of analog noise to be added to the selected signal, either , , or  wave. The signal-to-noise ratio (S/N) is determined by the S/N — N/S (dB) attenuator control (13). When in this mode, the peak to peak signal amplitude is reduced internally, since adding noise to the signal would overdrive the output amplifier.
9. **N/S** — Depressing this push button allows a calibrated amount of the selected signal, either , , or  wave, to be added to the analog noise. The noise-to-signal ratio (N/S) is determined by the S/N — N/S (dB) attenuator control (13). When in this mode, the peak to peak signal amplitude is reduced internally, since adding the signal to the noise would overdrive the output amplifier.



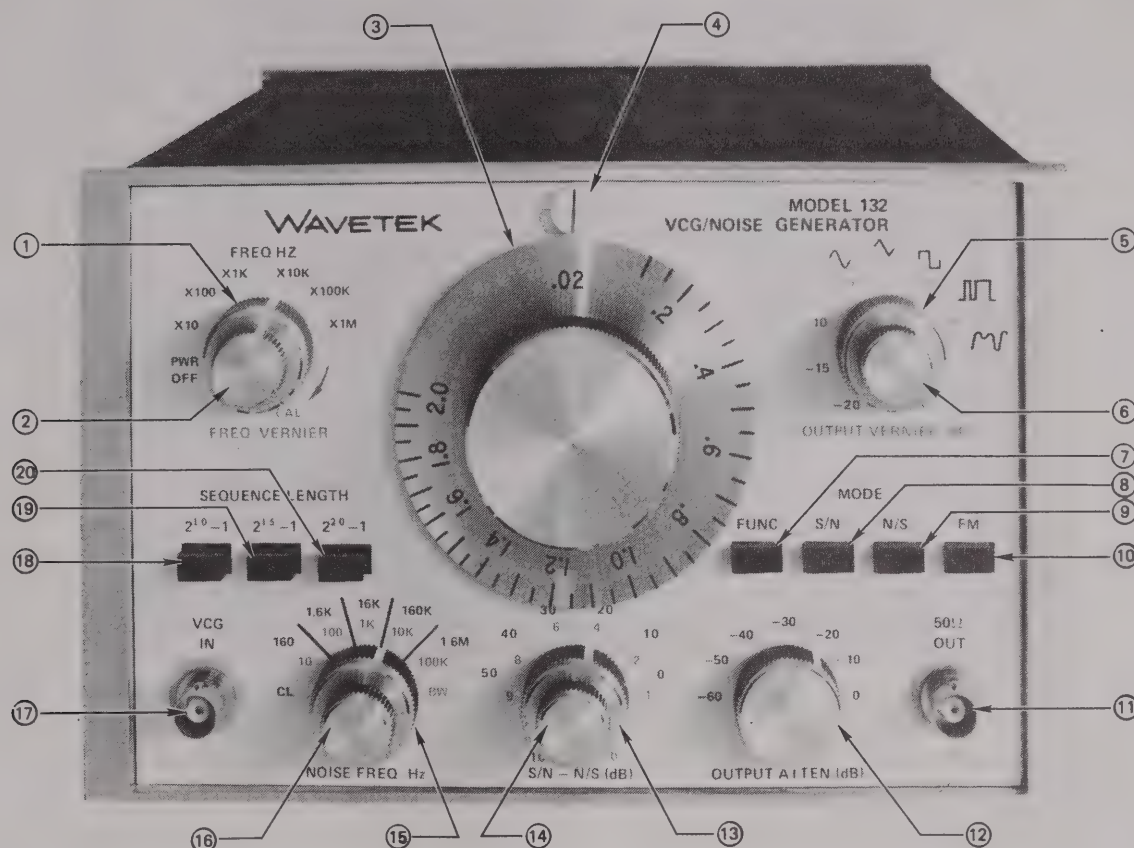


Figure 2-1. Operating Controls, Front Panel

10. **FM** — Depressing this push button along with the FUNC push button (7) allows the selected signal, either  $\sim$ ,  $\wedge$ , or  $\square$  wave, to be pseudo-randomly frequency modulated, or jittered. The modulating signal is provided by pseudo-random analog noise, and the S/N — N/S (dB) controls frequency deviation. The bandwidth of the modulating signal is controlled by the NOISE FREQ HZ selector (15) and vernier (16).

11. **50 $\Omega$  OUT** — Provides the selected generator output function. The generator may operate into an open circuit providing 20 V peak to peak maximum, or into a 50 $\Omega$  load providing a 10 V peak to peak output.

12. **OUTPUT ATTEN (dB)** — Attenuates the output (both signal and noise) from 0 dB to -60 dB in six calibrated 10 dB steps according to the following table:

Step Attenuator Position	Output peak to peak into 50 $\Omega$ Load	
	Maximum Vernier fully cw	Minimum Vernier*
0 dB	10 V	1 V
-10 dB	3 V	0.3 V
-20 dB	1 V	0.1 V
-30 dB	0.3 V	0.03 V
-40 dB	0.1 V	0.01 V
-50 dB	0.03 V	0.003 V
-60 dB	0.01 V	0.001 V

\* The values in this table are approximate. The OUTPUT VERNIER (dB) (6) will reduce the output approximately 20 dB in all cases, as shown.

13. **S/N — N/S (dB)** — In the S/N mode, this control attenuates the analog noise from 0 to -50 dB in five calibrated 10 dB steps. The selectable signal

amplitude remains constant, thus giving calibrated 0 to -50 dB signal-to-noise ratios. In the N/S mode, the signal is attenuated with the noise remaining unchanged, thus giving noise-to-signal ratios from 0 to -50 dB. The steps for this control are indicated in black numerals on the front panel.

14. **S/N — N/S (dB) Vernier** — Allows a calibrated fine adjustment of the S/N — N/S (dB) step attenuator (13). This control is continuously variable over at least a 10 dB range. When added to the coarse control (13), this amount equals the total S/N or N/S ratio. Approximate values of attenuation are indicated in red numerals on the front panel.
15. **NOISE FREQ HZ** — This range control selects the clock frequency, or bandwidth for the digital, or analog noise, respectively. When using the digital noise function, clock frequencies from 160 Hz through 1.6 MHz (indicated in black numerals and letters on the front panel) are available. When using analog noise or the S/N, N/S modes, the bandwidth of the analog noise may be selected from 10 Hz to 100 kHz (indicated in red numerals and letters on the front panel). In the FM mode, this control establishes the bandwidth of the analog noise used for frequency modulation. There are four detent positions with an overlapping vernier control (16). With the vernier in the full cw position, the clock frequency, or bandwidth, is equal to the value printed to the right of the detent mark.
16. **NOISE FREQ HZ Vernier** — As mentioned in number 15, this control provides a continuous, fine control between the detent positions of the coarse control. When in the full cw position, the clock frequency, or bandwidth, is equal to the value appearing at the right of the detent mark. As the knob is rotated ccw, the clock frequency, or bandwidth, is decreased. In the full ccw position, the actual value will be at least 10:1 (and as much as 100:1) lower than the value to the right of the detent mark.
17. **VCG IN** — This connector allows external voltage control of function generator frequency. Up to 1000:1 frequency change may be obtained. A positive voltage increases frequency and a negative voltage decreases frequency. Refer to "Operation as a Voltage Controlled Generator."

## SEQUENCE LENGTH

18.  **$2^{10} - 1$**  — Depressing this push button will provide 1,023 counts of the selected clock frequency, or bandwidth, determined by the NOISE FREQ HZ controls (15 and 16), for generation of a digital, or analog noise pattern. At the end of each sequence, the pattern is automatically repeated.
19.  **$2^{15} - 1$**  — Depressing this push button will provide 32,767 counts of the selected clock frequency, or bandwidth, determined by the NOISE FREQ HZ controls (15 and 16), for generation of a digital, or analog noise pattern. At the end of each sequence, the pattern is automatically repeated.
20.  **$2^{20} - 1$**  — Depressing this push button will provide 1,048,575 counts of the selected clock frequency, or bandwidth, determined by the NOISE FREQ HZ controls (15 and 16), for generation of a digital, or analog noise pattern. At the end of each sequence, the pattern is automatically repeated.

## REAR PANEL

21. **DC OFFSET** — This control adjusts the  $\pm 5$  V base line above or below ground ( $\pm 2.5$  V offset into  $50\Omega$  load). The OFF position gives normal vertical symmetry. Peak amplitude is limited by the dynamic range of the amplifier output.
22. **FUNCTION SYNC** — This connector provides a synchronizing signal output at the same frequency of the main generator; that is, at the same frequency as the sine, triangle or square wave. The amplitude is greater than 1 V peak to peak square wave into open circuit at  $600\Omega$  output impedance.
23. **NOISE SYNC** — This connector provides a synchronizing output signal for monitoring the digital or analog noise. A sync signal is generated at the beginning of each repetitive cycle for the selected sequence length of digital or analog noise.
24. **NOISE CLOCK** — This connector provides an external output of the basic clock frequency used to generate the digital sequence and analog noise.



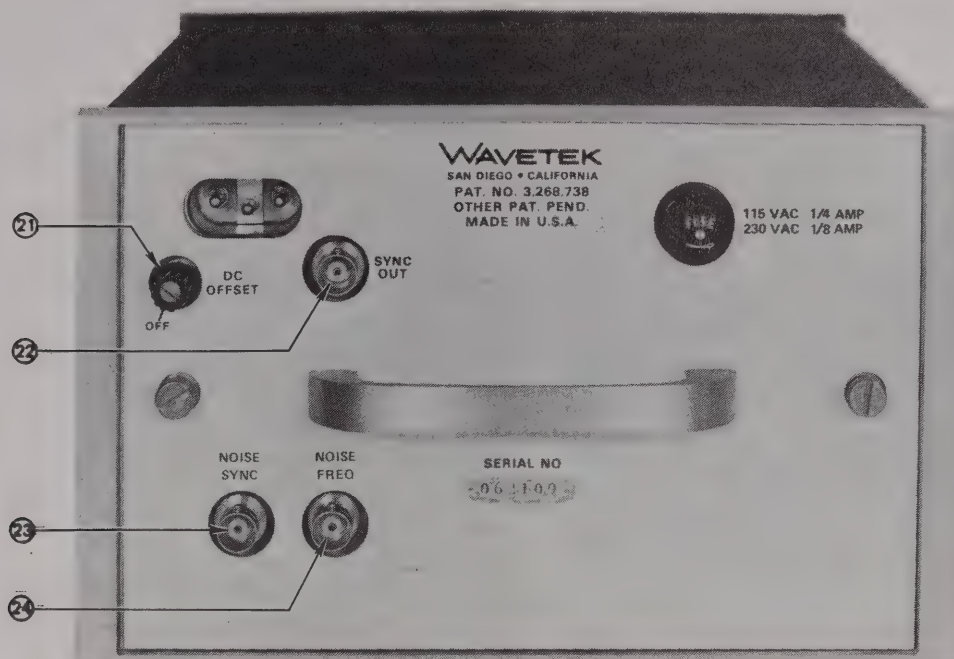


Figure 2-2. Operating Controls, Rear Panel

## OPERATION

No preparation for operation is required beyond completion of the initial installation previously stated in this section. It is recommended that a one-half hour warm-up period be allowed for the associated equipment to reach a stabilized operating temperature and for the Model 132 to attain stated accuracies.

### Operation as a Function Generator

1. Terminate 50 $\Omega$  OUT connector with 50 $\Omega$   $\pm$ 1%, 2 watt termination.
2. Select the desired waveform by setting function selector to  $\sim$ ,  $\wedge$ , or  $\square$ .
3. Set frequency dial and FREQ HZ range multiplier for desired output frequency.
4. Depress MODE — FUNC push button.
5. Select output signal amplitude by setting OUTPUT ATTEN (dB) control to appropriate attenuation position and fine adjusting signal to desired amplitude with OUTPUT VERNIER (dB) control.
6. A positive or negative dc offset may be applied to the waveform by setting the DC OFFSET (Rear Panel) to the desired level. The peak signal value plus the offset cannot exceed  $\pm$ 5.0 V into 50 ohms.

### Operation as a Voltage Controlled Generator

The VCG input connector can be used to externally control the frequency of the generator. If a positive voltage is applied to the VCG input terminal, the frequency will increase from the dial setting. A negative voltage will cause the frequency to decrease from the dial setting. The VCG range of the Model 132 is 1000:1.

1. Terminate 50 $\Omega$  OUT connector with 50 ohm  $\pm$ 1%, 2 watt termination.
2. Select the desired waveform by setting function selector to  $\sim$ ,  $\wedge$ , or  $\square$ .
3. Set FREQ HZ selector to desired multiplier.
4. Connect external voltage source (dc programming or wideband ac signal) to VCG IN connector.

#### NOTE

*VCG input requires 0 to  $\pm$ 5 volts for operation over full-scale range, but can withstand many times maximum input.*

5. Set frequency dial as follows:
  - a. For frequency modulation with ac input, set dial for center frequency.

- b. For increasing frequency sweep with positive dc input, set dial to lower frequency limit.
  - c. For decreasing frequency sweep with negative dc input, set dial to upper frequency limit.
6. To sweep the audio range from 20 Hz to 20 kHz, set the controls to 20 Hz as follows:
  - a. Set the main dial to 0.02.
  - b. Set the frequency vernier to the full ccw position.
  - c. Introduce a 0 to +5 V ramp into the VCG input connector.

The maximum frequency which may be obtained, when using the VCG input, is the range multiplier times the value at the top of the dial (2.0). The minimum frequency is the range multiplier times the value at the bottom of the dial (0.002 – frequency vernier must be in ccw position). Verify this using the nomograph in Figure 2-3.

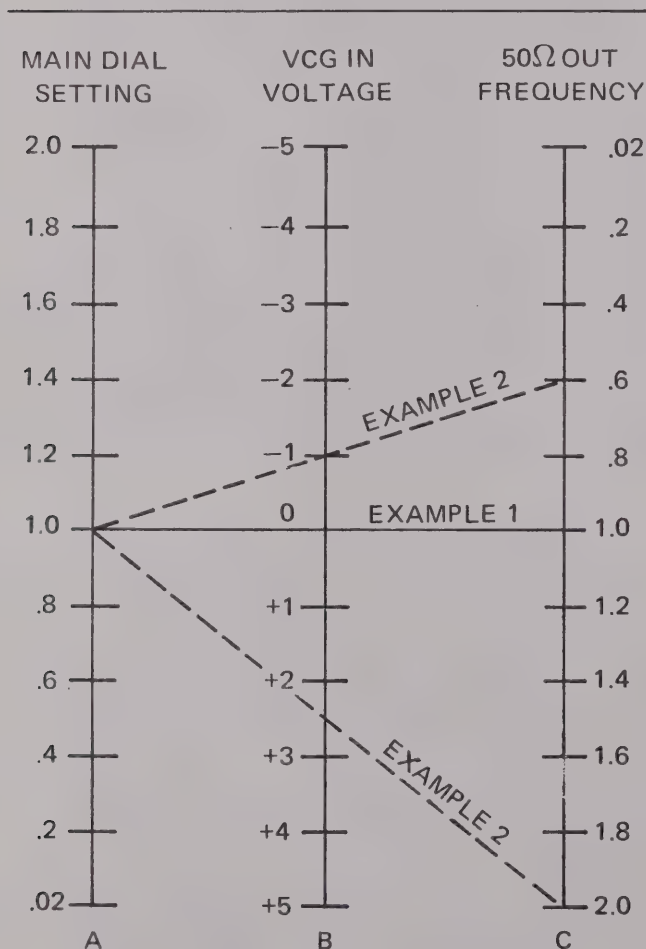


Figure 2-3 - VCG Voltage-to-Frequency Nomograph

In example 1, the dial is set at 1.0 and 0 voltage is applied to the VCG input. Extend a straight line from 1.0 (dial setting) through 0 voltage (VCG voltage) and obtain a dial frequency of 1.0. For the total output frequency, multiply the range by 1 with the same dial setting. Example 2 shows the results of using a ramp from -1 volt to +2.5 volts for the VCG voltage. This results in a swept output from 0.6 to 2.0 on the dial. Remember to multiply the dial times the range.

#### Operation as a Calibrated Signal-to-Noise Source

1. Select the desired signal waveform by setting function selector to  $\sim$ ,  $\wedge$ , or  $\square$ .
2. Set frequency dial and FREQ HZ range multiplier for desired signal output frequency.
3. Depress MODE – S/N push button.
4. Select noise bandwidth by setting NOISE FREQ HZ control to desired range and fine adjusting bandwidth by turning the noise frequency Hz vernier control.
5. Select desired SEQUENCE LENGTH by depressing appropriate push button.
6. Select signal-to-noise ratio by setting S/N – N/S (dB) control to appropriate attenuation position and fine adjusting attenuation to desired value with S/N – N/S vernier control.
7. Select total output amplitude by setting OUTPUT ATTEN (dB) control to appropriate attenuation position and fine adjusting signal to desired amplitude with OUTPUT VERNIER (dB) control.

#### Operation as a Calibrated Noise-to-Signal Source

1. Select the desired signal waveform by setting function selector to  $\sim$ ,  $\wedge$ , or  $\square$ .
2. Set frequency dial and FREQ HZ range multiplier for desired signal output frequency.
3. Depress MODE – N/S push button.
4. Select noise bandwidth by setting NOISE FREQ HZ control to desired range and fine adjusting bandwidth by turning the noise frequency Hz vernier control.
5. Select desired SEQUENCE LENGTH by depressing appropriate push button.
6. Select noise-to-signal ratio by setting S/N – N/S (dB) control to appropriate attenuation position and fine adjusting attenuation to desired value with S/N – N/S vernier control.
7. Select total output amplitude by setting OUTPUT ATTEN (dB) control to appropriate attenuation position and fine adjusting signal to de-



sired amplitude with OUTPUT VERNIER (dB) control.

### Operation as a Random FM Source

Before using the generator as a random FM source, please note the following.

The frequency of the generator is being varied or modulated by a changing voltage in the same way as described in "Operation as a Voltage Controlled Generator." However, instead of using a dc ramp, or ac signal, a random analog voltage is used. When the FM push button is depressed, the analog noise is injected internally into the VCG circuit; therefore, the modulation is created by random noise. The S/N — N/S (dB) knob controls the maximum amount of frequency deviation, since it controls the amplitude of the noise. Bandwidth of the FM signal is controlled by the NOISE FREQ HZ control. Using the generator in the FM mode may be accomplished as follows:

1. Select the desired signal waveform by setting function selector to  $\sim$ ,  $\wedge$ , or  $\square$ .
2. Set frequency dial and FREQ HZ range multiplier for desired center output frequency.
3. Depress MODE — FUNC and FM push buttons.
4. Select the bandwidth by setting NOISE FREQ HZ control to desired range and fine adjusting frequency by turning the noise frequency Hz vernier control.
5. Select desired SEQUENCE LENGTH by depressing appropriate push button.
6. Select signal frequency deviation by setting S/N — N/S (dB) control to appropriate attenuation position and fine adjusting attenuation to desired deviation with S/N — N/S vernier control.
7. Select output signal amplitude by setting OUTPUT ATTN (dB) control to appropriate attenuation position and fine adjusting signal to desired amplitude with OUTPUT VERNIER (dB) control.

### Operation as a Digital or Analog Noise Source

1. Set function selector to digital or analog noise position.
2. Depress MODE — FUNC push button.
3. Select clock frequency for digital or bandwidth for analog noise by setting NOISE FREQ HZ control to desired range and fine adjusting frequency by turning the noise frequency Hz vernier control.

4. Select desired SEQUENCE LENGTH by depressing appropriate push button.
5. Select noise amplitude by setting OUTPUT ATTN (dB) control to appropriate attenuation position and fine adjusting noise to desired amplitude with OUTPUT VERNIER (dB) control.

### Connect Signal and Chassis Grounds

The instrument is shipped from the factory with the signal ground floating above chassis ground, unless otherwise specified. A common signal/chassis ground can be obtained as follows:

1. Remove power cord.
2. Loosen two captive thumb screws on rear panel and remove panel.
3. Solder a jumper wire between the ground lugs (green wires) of the SYNC OUT connector and the power connector (Figure 2-4).

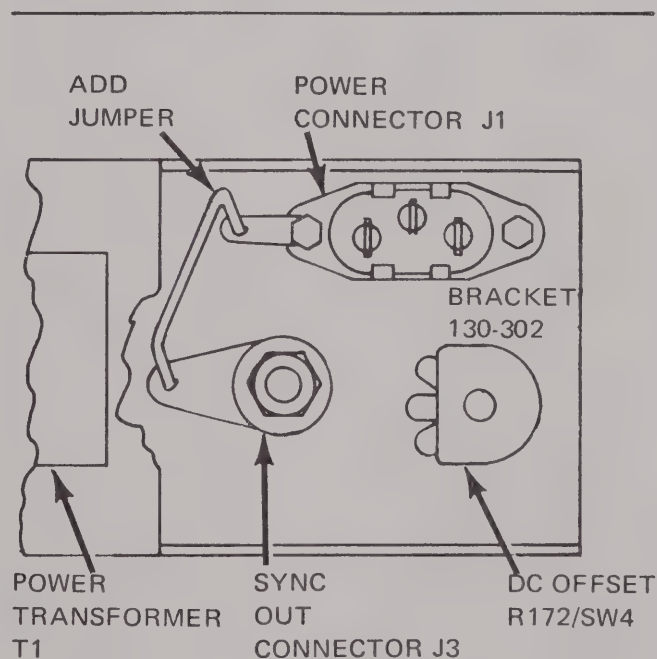


Figure 2-2. Common Ground Connection Diagram

### Converting Output Impedance to 600 Ohms

Unless otherwise specified, this instrument was shipped with 50 ohm output impedance, but can be converted to 600 ohm output if needed. Place a 550 $\Omega$  resistor in series with the wire leading from the center tap of the 50 $\Omega$  OUT BNC and the attenuator control.

### **Converting to 230-Volt Line Power**

Instruments are shipped from the factory with the power transformer connected for 115-volt line power, unless ordered for 230-volt use. Converting a 115-volt unit for 230-volt operation is a simple matter.

1. Remove power cord.
2. Loosen two captive thumb screws on rear panel and remove panel.
3. The conversion switch is located on the chassis. Use a thin-bladed screwdriver to move the 115-230 switch to the 230 position.
4. Replace 1/4-ampere fuse with a 1/8-ampere fuse of the same type.



# SECTION 3

## CIRCUIT DESCRIPTION

### GENERAL DESCRIPTION

Refer to the block diagram of the Model 132 VCG/ Noise Generator, Figure 3-1.

Basically, a square wave is applied to the input of an integrator composed of a wide-band differential dc amplifier, integrating resistor and capacitor. Output

of the integrator is fed into the hysteresis switch. The hysteresis and output switches function like a Schmitt trigger with the limit points set at the waveform extremes, firing when the triangle wave reaches +1.25 volts and -1.25 volts. When firing occurs, the hysteresis and output switches are set, reversing the square wave fed into the integrator. Reversal of the square wave causes the triangle wave to reverse direc-

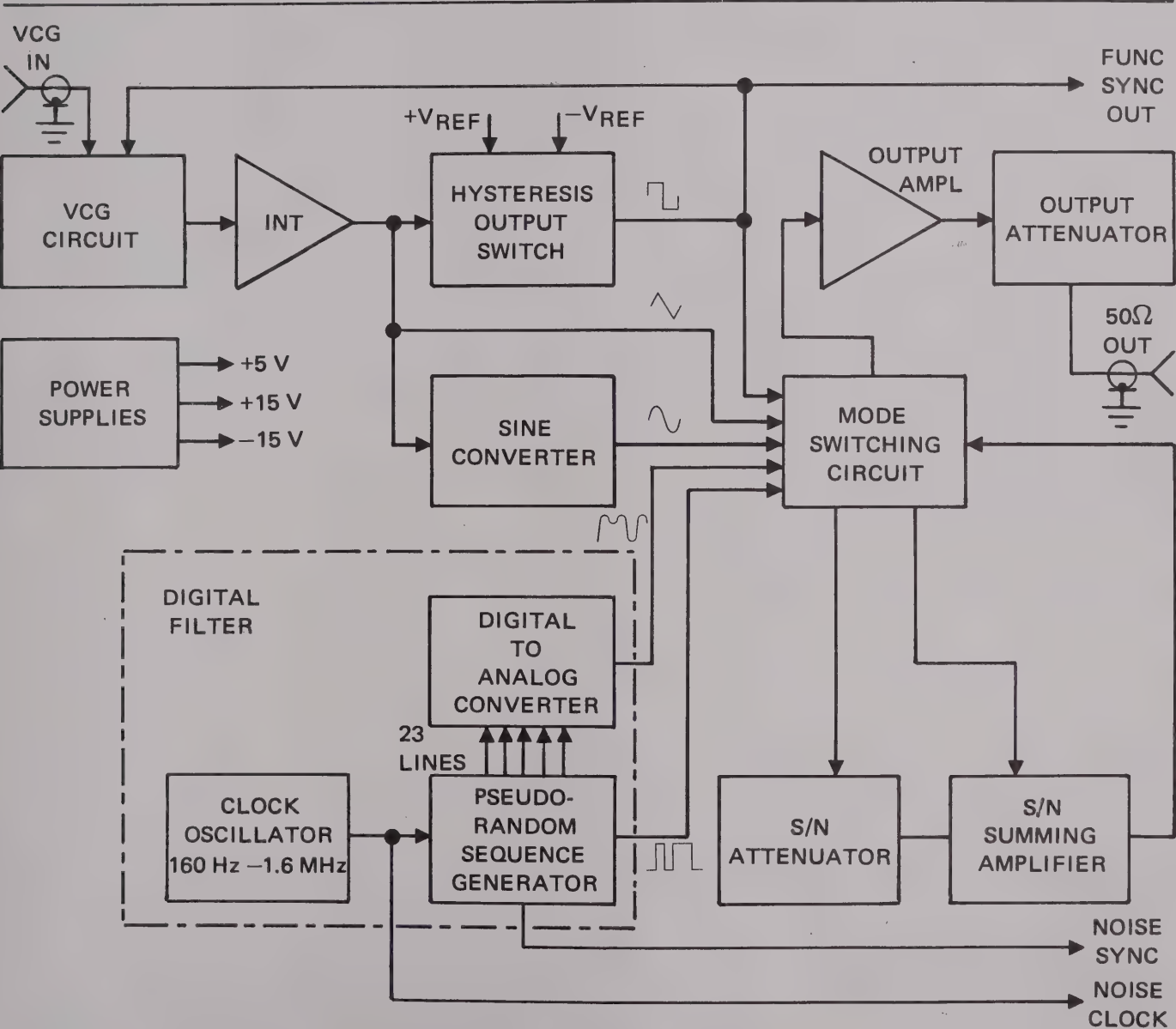


Figure 3-1. Functional Block Diagram

tion. The result is simultaneous generation of a square wave and triangle wave of the same frequency with the positive half cycle of the square wave coincident with the negative slope of the triangle wave.

The magnitude of the capacitor across the integrator and amplitude of the current into the integrator determine the frequency of oscillation. Capacitance across the integrator is changed by rotating the frequency Hz selector. Amplitude of the current into the integrator is determined by four parameters which are summed in the VCG circuit: (1) hysteresis switch output, (2) the frequency dial voltage, (3) the frequency vernier voltage, (4) the VCG analog voltage input and (5) the analog noise when in the FM mode.

The sine wave is produced by feeding the triangle wave into a shaping network composed of resistors and diodes. As the triangle wave voltage passes through zero, loading of the triangle wave is minimal and thus the slope is maximum. As the triangle voltage increases, diodes with current limiting resistors conduct and successively cause the slope of the output to be reduced.

Since the diode break points are mathematically computed and fitted to the true sine shape, the resultant waveform resembles a pure sine wave. Using a complementary pair of diodes on each break point, the circuitry is completely symmetrical about ground. The sine wave, produced by shaping, is considerably less in amplitude than the triangle wave input and is thus amplified to be equal to the triangle wave.

Either square, triangle, or sine waveforms can be selected as a signal source. The noise source is derived from a digital filter. A clock oscillator of 160 Hz to 1.6 MHz range functions as a trigger source for the digital pseudo-random sequence generator (PRSG). Output of the PRSG is a random binary signal that can function as digital noise. The number of bits in each sequence can be selected by the SEQUENCE LENGTH controls. Parallel data is fed from the PRSG to the digital-to-analog converter where the information is summed and filtered to provide a random analog noise signal.

The selected sine, triangle, square, analog noise, or digital noise signal is routed to the mode control circuitry where one of the following modes of operation is selected: Function (FUNC); frequency modulation (FM); signal-to-noise (S/N); or noise-to-signal (N/S). In the signal-to-noise and noise-to-signal modes, one signal is fed to the S/N attenuator and then mixed with the other signal in the S/N summing amplifier in a known dB ratio selected by the S/N attenuator. Output of the mode switching circuit is coupled to the output amplifier. From the output amplifier the signal is fed to the precision output attenuator and finally to a  $50\Omega$  output connector.

All circuits, except for the hysteresis switch, output amplifier, and PRSG, operate from  $\pm 15$  volt supplies. The hysteresis switch and power amplifier require  $\pm 6$  volts and  $\pm 22$  volts, respectively. Operation of the PRSG requires a +5 V supply.



# SECTION 4

## MAINTENANCE

### INTRODUCTION

This section provides instructions for testing, calibrating, troubleshooting, and repairing the Model 132. The instructions are concise and for the experienced electronics technician or field engineer. Wavetek maintains a factory-repair department for those customers not possessing the necessary personnel or test equipment to maintain the instrument. If an instrument is returned to the factory for calibration or repair, a detailed description of the specific problem should be attached to facilitate the turn around time. Test point and adjustment locations are illustrated in Section 5.

### RECOMMENDED TEST EQUIPMENT

Table 4-1 contains a list of recommended test equipment. Any test equipment having equivalent accuracies may be substituted for those listed.

Table 4-1. TEST EQUIPMENT

Name	Required Characteristics
Oscilloscope	To 30 MHz
Plug-in	Dual Channel
Plug-in	Peak mV measuring capability
Distortion Analyzer	To 600 kHz
Spectrum Analyzer	To 50 MHz
Display	
IF Section	
RF Section	
Voltmeter	Millivolt dc measurement (10 millivolt resolution)
Counter	To 10 MHz
Scope Probe	X1 Attenuation

### CHECKOUT AND CALIBRATION

The following paragraphs provide complete sequential calibration procedures for the Model 132. Instrument checkout procedures are indicated by a check mark

(✓) following the procedure title. A quick checkout of the instrument can be performed by comparing the indicated parameters with the tolerances given in the Specifications of Section 1.

#### NOTE

*The entire calibration procedure must be read first to determine initial control settings and test equipment connections before attempting checkout.*


#### Preliminary Procedures

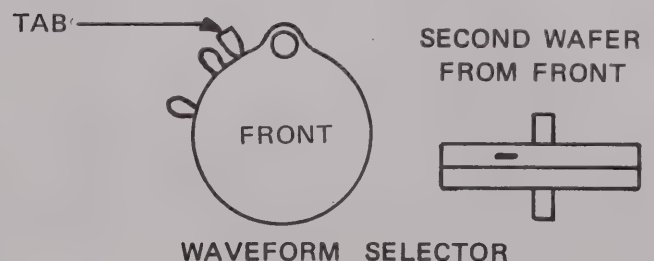
1. Set FREQ HZ selector to X1K position.
2. Depress MODE — FUNC push button.
3. Set OUTPUT ATTEN (dB) selector to 0 position.
4. Allow one-half hour for warm-up.

#### Power Supply Regulation

1. Connect voltmeter between TP1 (common) and TP2 (+) on main board. Adjust R104 for +15 Vdc  $\pm 100$  mV.
2. Connect voltmeter between TP1 (common) and TP3 (—). Since the negative supply is referenced to the +15 V supply, the voltmeter should indicate  $-15$  Vdc  $\pm 100$  mV.
3. Connect voltmeter between +5 V and location DG on analog board. Verify that voltage is +4.75 to +5.25 volts.

#### Square Wave Amplitude Symmetry

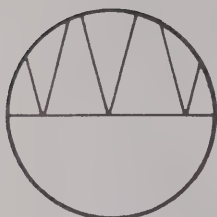
1. Set function selector to .
2. Connect oscilloscope, with peak mV plug-in, to tab of switch SW3B, as illustrated below.



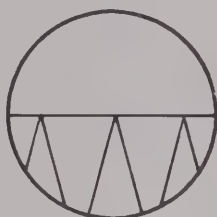
- Using a comparator, set the positive peak to the center of the scope. Switch the comparator to the negative peak and adjust R121 so that the negative peak equals the positive peak.

### Triangle Amplitude

- Set frequency dial for 2.0 (X1K range) and function selector to  $\wedge$ .
- Connect oscilloscope, with peak mV plug-in, to tab of switch SW3B, as illustrated under "Square Wave Amplitude Symmetry."
- Adjust R56 on main board for positive peak at +1.25 volts  $\pm 5$  mV (see sketch).
- Adjust R59 for negative peak at -1.25 V  $\pm 5$  mV.



Negative Peak



Positive Peak

### Output Amplifier ✓

- Connect oscilloscope to 50 $\Omega$  OUT connector with 50 $\Omega$  terminator loaded at oscilloscope (  $\square$  function).
- Set FREQ HZ selector for X1K (FREQ VERNIER fully cw) and frequency dial at 2.0.
- Turn OUTPUT VERNIER (dB) fully ccw.
- Adjust R150 for amplitude symmetry about ground.
- Set FREQ HZ selector for X1M (2.0 dial setting).
- Turn OUTPUT VERNIER (dB) fully cw.
- Adjust C64 to provide a flat square wave with 100 nanosecond rise time.

### First VCG Null ✓

- Connect oscilloscope to 50 $\Omega$  OUT connector.
- Set FREQ HZ selector to X1K. Set frequency dial to 0.02 and turn FREQ VERNIER to CAL position.
- Short and open VCG IN to signal ground (outside of BNC connector) while monitoring output frequency variation. Adjust R11 for minimum frequency change using X20 horizontal magnification on oscilloscope.

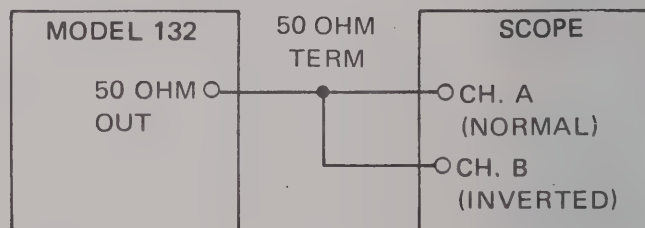
### Time Symmetry ✓

- Connect unit and oscilloscope, with dual channel plug-in set for alternate display, as shown in Figure 4-1.
- Set FREQ HZ selector for X100K with FREQ VERNIER in CAL position (  $\square$  function).
- Set frequency dial to 0.02 to provide 2 kHz display on oscilloscope.
- Adjust R28 for time symmetry with frequency dial set to 0.02.
- Turn FREQ VERNIER fully ccw and adjust R22 for time symmetry.

#### NOTE

*Interaction occurs between R28 and R22. Repeat steps 4 and 5 until 1% symmetry accuracy is met. (On oscilloscope 1% - 1 cm at 0.1  $\mu$ sec with X10 horizontal magnification.)*

- Check for waveform time symmetry at the 0.2 and 2 frequency dial settings.
- Check to assure FREQ HZ selector is set to X100K position with FREQ VERNIER turned fully ccw.
- Turn frequency dial fully cw.
- Check frequency ratio from top range setting to 1/1000 of range (not dial setting).
- Adjust R8, if necessary, for slightly greater than 1000:1 ratio.



Trigger: Internal      Time Base: 50 microseconds/cm for 1/100 of 200 kHz

Display: Alternate      500 microseconds/cm for 1/1000 of 200 kHz

Figure 4-1.

Time Symmetry Measurement for Test Setup



## Frequency Calibration ✓

1. Connect counter to 50Ω OUT connector.
2. Set FREQ HZ selector to X10K and FREQ VERNIER fully cw.
3. Align 2.0 dial mark with the dial indicator index and alternately switch from X10K to X1K range while adjusting R4 for a balanced error between the two positions of less than 2%.
4. Set FREQ HZ selector to X100K and dial at 2.0.
5. Adjust C16 to obtain 200.0 kHz on counter display.
6. Set FREQ HZ selector to X1M. Adjust C12 to obtain 2.00 MHz on counter display.
7. Dial alignment — No alignment is necessary if the dial is the push-on type. If it has a set screw, consult the factory for CAL procedure.

## Sine Distortion, Amplitude, and Balance ✓

1. Set FREQ HZ selector for X1K, FREQ VERNIER fully cw, function selector to  $\sim$ , and frequency dial at 2.0.
2. Connect oscilloscope, with peak mV plug-in, to orange wire on function switch.
3. Adjust R133 to obtain 2.5 V p-p  $\pm 25$  mV output.
4. Adjust R128 to balance output.
5. Connect the unit, distortion analyzer, and oscilloscope as shown in Figure 4-2.
6. Adjust R126 and R127 for less than 0.5% sine distortion (see photo).
7. Set FREQ HZ selector to X10K.

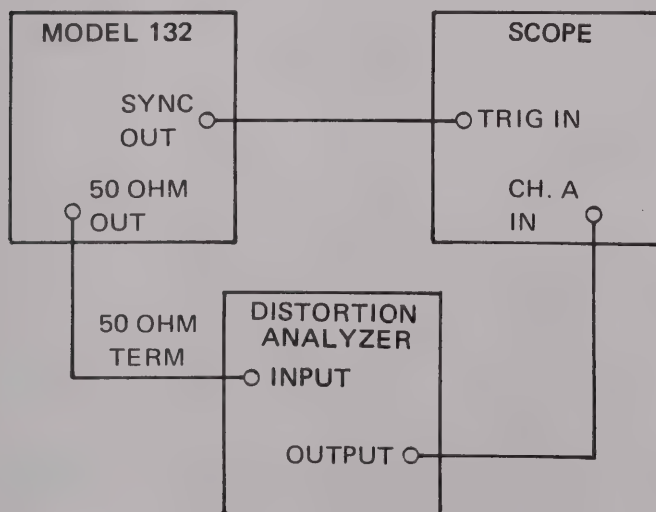
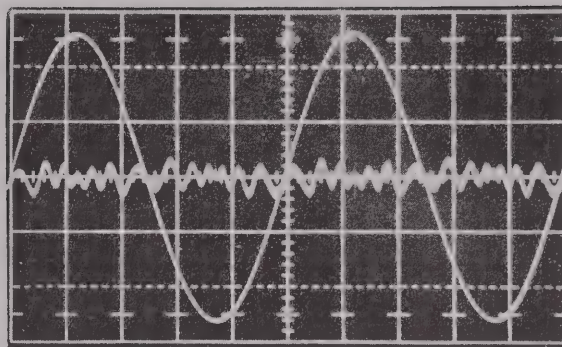


Figure 4-2. Distortion Analysis Test Setup



8. Repeat step 6 for steps 1 and 7 to obtain less than 0.5% distortion at both X1K and X10K ranges.
9. Repeat steps 2, 3 and 4.
10. Connect spectrum analyzer and check sine distortion at 2 MHz.

## Clock Frequency Calibration ✓

1. Remove power from unit.
2. Remove two Phillips head screws from logic board (one from left side of board, one from right side).
3. Remove two 2½" standoff screws at rear of logic board.
4. Lift front edge of logic board until board is standing upright. (Right rear edge of logic board will now be resting on sine module.)
5. Place at least ¼" of styrofoam, or other suitable insulating material, between BNC connectors and main board. (BNC connectors are located near left rear edge of logic board.)

### CAUTION

Failure to adequately insulate BNC connectors from main board may result in electrical damage.

6. Apply power to unit.
7. Set function selector to  $\square$  position.
8. Set NOISE FREQ HZ selector to 1.6M position and NOISE FREQ HZ vernier fully cw.
9. Connect counter to NOISE CLOCK connector (rear panel).
10. Adjust C6 on digital board for 1.6 MHz (ideally 1.62 MHz).
11. Turn NOISE FREQ HZ vernier fully ccw and adjust R2 for 150 kHz  $\pm 1$  kHz.

## Digital Noise Amplitude Symmetry ✓

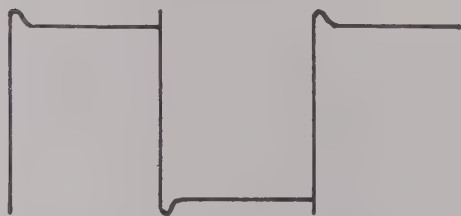
1. Set function selector to  $\square\square\square$ , NOISE FREQ HZ selector to 160 kHz, and depress SEQUENCE LENGTH —  $2^{15}$  — 1 push button.
2. Connect oscilloscope, with peak mV plug-in, to location DN on digital board.
3. Adjust R36, using comparator, to provide a positive peak of  $+1.25\text{ V} \pm 10\text{ mV}$ .
4. Adjust R39, using comparator, to provide a negative peak of  $-1.25\text{ V} \pm 10\text{ mV}$ .

## Analog Noise Amplitude Symmetry

1. Connect BNC cable to NOISE SYNC connector (rear panel) and sync connector on oscilloscope.
2. Depress SEQUENCE LENGTH —  $2^{15}$  — 1 push button.
3. Connect oscilloscope to location AN on digital board.
4. Adjust R22 (gain) and R23 (balance) to provide a 2.5 V p-p signal centered about ground.

## S/N Frequency Compensation ✓

1. Set function selector to  $\square\square$ .
2. Depress MODE — S/N push button.
3. Set frequency dial to 1.0 and FREQ HZ selector to X100K (100 kHz).
4. Set S/N — N/S (dB) selector to +50 position and turn vernier to +9 position to provide approximately +59 dB.
5. Turn OUTPUT VERNIER (dB) full cw.
6. Connect oscilloscope to  $50\Omega$  OUT connector with  $50\Omega$  terminator (  $\square\square$  function).
7. Adjust C5 on analog board for a slightly peaked square wave response, as illustrated below.



8. Remove power from unit.
9. Remove material insulating BNC connectors from main board.
10. Lower logic board and align holes in side of board with screw holes.
11. Install two side screws to secure logic board.
12. Install both  $2\frac{1}{2}$ " standoff screws at rear of logic board.
13. Install cover on unit.

## TROUBLESHOOTING

### Basic Techniques

Troubleshooting the Model 132 requires no special technique. Listed below are a few reminders of basic electronics fault isolation.

1. Check control settings carefully. Many times an incorrect control setting, or a knob that has loosened on its shaft, will cause a false indication of a malfunction.
2. Check associated equipment connections. Make sure that all connections are securely connected to the correct connector.
3. Perform the checkout procedure. Many out-of-specification indications can be corrected by performing specific calibration procedures.
4. Visually check the interior of the instrument. Look for such indications as broken wires, charred components, loose leads, etc.

### Troubleshooting Chart

Table 4-2 provides a list of possible malfunction symptoms, their probable causes, and the prescribed remedies. Also listed in this table are the test points at which measurements are to be made and the parameter tolerances at these points. To use the troubleshooting chart, locate the symptom listed in Column 1 and follow the corresponding procedures. Localize the fault to a specific stage by checking the parameters given for the major test points. Then check the dc operating voltages at the pins of solid-state devices. Check associated passive elements with a high input impedance ohmmeter (power off) before replacing a suspected semiconductor element.




### Troubleshooting Hints

The interactive nature of a closed loop presents a somewhat special problem when approached from a troubleshooting standpoint. The simplest way to reduce problem complexity is to open the loop, thereby removing the interaction. The basic units of the loop can then be tested individually. The following step-by-step procedure describes how this is done. (The generator loop is all contained on the main board.) Consult the next paragraph for removal of cover and panels.

1. Set instrument controls for 20 V p-p, 2 kHz sine-wave output.



**Table 4-2. TROUBLESHOOTING CHART**

Symptom	Probable Cause	Corrective Procedures
No outputs at 50Ω OUT connector	Blown Fuse	Replace F1. a. 1/4A — 115 Vac b. 1/8A — 220 Vac
	Power Supply	Check TP1/TP2 for +15 V; +5 V/DG for +5 V; TP1/TP3 for −15 V; TP1/TP5 for +6 V; TP1/TP6 for −6 V. Troubleshoot associated regulator.
	Output Amplifier	Check at PH for waveform as selected by position of waveform switch. a. If waveform is present, troubleshoot output amplifier. b. If no waveforms are present, refer to Troubleshooting Hints.
	50Ω Attenuator	Check to see that output is present at switch. If it is, the switch is defective.
No sine wave output	Sine Amplifier	Check for 260 mV p-p sine wave at pin 4 of IC8. a. If present, check IC8 circuit. <i>NOTE: Triangle wave must be present at pin 2 of A1 to obtain sine wave output.</i> b. If not present, check A1 circuit.
No triangle, sine, or square wave	Generator Loop	Refer to Troubleshooting Hints.
No 	Power Supply	Check for correct voltages.
	Clock Oscillator	Check Q1 — Q8 circuit.
	Faulty IC	Refer to Troubleshooting Hints.
	Shaping Amplifier	Check Q12 — Q14 circuit.
No 	No 	(See above.)
	Faulty Summing Amplifier	Check Q9 — Q11 circuit.
	Faulty Low Pass Filter	Check IC1 circuit.
No output in S/N or N/S	Faulty Summing Amplifier	Check IC2 circuit.
No noise in S/N mode	Faulty Attenuator	Check Test Point AW for noise. If not present and controllable by S/N — N/S (dB) switch, the switch is defective. If present, check IC1 and IC2 circuits.

**Table 4-2. TROUBLESHOOTING CHART (Continued)**

Symptom	Probable Cause	Corrective Procedures
All waveforms low in amplitude	Power Amplifier	a. Check front panel amplitude control. b. Perform balance adjustment for power amplifier.
	Power Supply	Check for correct voltages.
All waveforms low in amplitude	Power Amplifier	a. Check front panel amplitude control. b. Perform balance adjustment for power amplifier.
	Power Supply	Check for correct voltages.
Frequency out of tolerance	Power Supply	Check for correct power supply voltage as stated above.
	Maladjustment	Perform calibration procedure.
Sine wave not in spec	Maladjustment	Perform sine distortion, amplitude, and balance adjustments.
	Sine Converter	Check for 260 mV p-p sine wave at pin 4 of IC8. a. If normal, check sine amplifier IC8. b. If normal, check A1 circuit.
Time symmetry of waveforms not correct	Maladjustment	Perform time symmetry and frequency adjustments.

2. Check at coaxial-wire lug of function selector switch for a 2.5 V p-p square wave. If normal, check output amplifier (Q34 – Q40).
3. Unsolder and lift the end of R51 (TP7). This is the output of the integrator and input to the hysteresis switch. The generator loop has now been opened.
4. Inject a 2.5 V p-p triangle waveform into the hysteresis switch input lead (TP7).
5. Check at the coaxial-wire lug of the function selector switch for a 2.5 V p-p square wave at the injected frequency.
  - a. If present, hysteresis and output switches are functioning normally. Proceed to Step 6.
  - b. If abnormal, check Q6 – Q16 stages.
6. Vary frequency dial from ccw to cw while observing TP11 with a scope. Voltage at this point should remain at 0 volts throughout dial rotation. If a voltage variation is observed, check IC1 stage.
7. Vary frequency dial from ccw to cw while observing TP4. Voltage reading should vary from 0 to approximately –6 volts. If voltage does not vary, check IC2 stage and IC1 stage.
8. Vary frequency dial from ccw to cw while observing TP9. Voltage reading should remain at 0 volts. If voltage varies, check IC3 stage.
9. Vary frequency dial from ccw to cw while observing TP10. Voltage should vary from 0 V to approximately +6 V. If voltage does not vary, check IC2 stage and IC3 stage.
10. Vary frequency dial from ccw to cw while observing TP8. Voltage reading should remain at 0 volts. If voltage varies, check IC4 and IC5 stages.
11. Reinstall R51.

#### DIGITAL BOARD

If a fault in the logic circuit of the digital filter is sus-



pected, the following procedure may be used to isolate the bad IC.

1. Set clock frequency to 1.0 MHz.
2. Verify that a clock pulse appears at pins 9 and 12 of IC2 through IC13.
3. Short circuit test point RT to DG. (This opens the digital feedback loop.)
4. Check for logic "zero" at pins 3 and 5 of IC2 through IC13.
5. Check for logic "one" at pins 2 and 6 of IC2 through IC13.
6. Check logic states of all gates using the known states of the register.

## REMOVAL OF DUST COVERS AND PANELS

1. To gain access for calibration or maintenance, proceed as follows:
  - a. Remove power cord.
  - b. Loosen the two knurled captive screws on the rear panel.
  - c. Pull off the rear panel.
  - d. Remove the cover.
2. To gain access to the digital board, proceed as follows:
  - a. Remove the four screws holding the digital board.
  - b. Rotate the board upward using the rear of the instrument as a pivot point.
3. To gain access to the analog board and/or the main board, proceed as follows:
  - a. Remove digital board.
  - b. Remove one screw and shoulder washer holding 5 V regulator to side plate.
  - c. Remove all knobs below the push button switches.
  - d. Remove two nuts, washers, and insulators holding the switch assembly to the front panel.
  - e. Remove two screws holding rear bracket to chassis.
  - f. Disconnect all AMP pin connections between main board and analog board.
  - g. Unsolder two wires from 50 $\Omega$  OUT connector.
  - h. Unsolder coaxial cable from main board to 50 $\Omega$  attenuator.
  - i. Remove four screws holding analog board to side plates.
  - j. Carefully lift rear of analog board to clear the sine converter and slide analog board,

rear bracket and digital board away from the front panel.

4. To gain access to any part mounted on upper rear bracket, proceed as follows:
  - a. Remove digital board.
  - b. Remove two screws holding lower and upper rear brackets to chassis.
  - c. Remove one heat sink mounting screw.
  - d. Remove bottom transformer mounting block screw.
  - e. Remove the two screws, lock washers and hex nuts holding two wafers of FREQ HZ switch to bracket assembly.
  - f. Remove two screws holding bracket assembly to main board.
  - g. Carefully pull bracket assembly to rear to obtain working room. Enough slack is available in the wiring for all normal operations.
5. To remove front panel, proceed as follows:
  - a. Remove rear panel and dust cover as previously described.
  - b. Remove all knobs, except frequency dial.
  - c. Unsolder BNC connections.
  - d. Tag and unsolder frequency-dial potentiometer leads.
  - e. Pull light bulb from indicator lens.
  - f. Remove four front panel retaining screws.
  - g. Remove two hex nuts, lock washers, and shoulder washers holding switch bracket assembly to front panel.
  - h. Carefully pull off front panel with frequency dial/potentiometer still attached.

## REPLACEMENT OF SWITCH WAFERS AND POTENTIOMETERS

1. To replace FREQ HZ switch wafer C or D or the FREQ VERNIER potentiometer, proceed as follows:
  - a. Remove rear panel and dust cover as previously described.
  - b. Separate bracket assembly from chassis as previously described.
  - c. Tag and unsolder leads to part being replaced.
  - d. Pull defective part off shaft and repair or replace with recommended replacement part.
2. To replace FREQ HZ switch wafer A or B, proceed as follows:
  - a. Remove rear panel and dust cover as previously described.
  - b. Remove front panel as previously described.

- c. Tag and unsolder wires to switch wafers A and B.
  - d. Remove digital and analog boards as previously described.
  - e. Unsolder wafer B PC-tabs from printed circuit boards.
  - f. Lift switch shaft slightly to free PC-tabs, rotate switch shaft so wafers clear board parts, and pull shaft end free of rear-mounted wafers C and D.
  - g. Repair or replace defective part.
3. To repair or replace function selector wafers or OUTPUT VERNIER (dB) potentiometer, proceed as follows:
- a. Remove rear panel and dust cover as previously described.
  - b. Tag and unsolder wires to defective part.
  - c. Remove digital and analog boards as previously described.
  - d. Unsolder potentiometer PC-tabs, lift shaft slightly to free tabs, rotate switch shaft so

wafers clear board parts, and pull switch/potentiometer assembly out of front panel hole.

- e. Repair or replace defective part.

## REPLACEMENT OF SINE CONVERTER

- 1. Remove rear panel and dust cover as previously described.
- 2. Remove digital board as previously described.
- 3. Unsolder the five pins of sine converter A1 from top of the printed circuit board, using a solder syringe.
- 4. Lift assembly from bottom of the board; a thin pencil-type soldering iron can be used, if necessary, to apply temporary heat during removal.
- 5. Replace sine converter.



# SECTION 5

## DATA PACKAGE

### INTRODUCTION

This section contains data packages for the Model 132. Each data package is a quick-access document, containing maintenance data arranged for convenient viewing of the schematic diagram and all supporting data. Each data package includes a parts-location illustration, a replaceable parts list, voltage/waveform data, and a schematic diagram. Voltage and waveform

data are provided on the diagrams at indicated test points as an aid to troubleshooting.

### RECOMMENDED SPARE PARTS LIST

Information is provided to maintain the instrument on a component level. Price and delivery information should be obtained from the Wavetek representative in your area or directly from the factory.

DESCRIPTION	MANUFACTURER	PART NO.	QTY
DIODE	FAIRCHILD	FD6666	2
DIODE	SEMTECH	SCE-1	2
DIODE	WAVETEK	130-506	1
FUSE 1/8A 250 V	BUSSMAN	MDL 1/8	1
FUSE 1/4A 115 V	LITTELFUSE	313-250	
IC	RCA	*CA3039 (-18)	1
IC	RCA	*CA3030 (-15)	1
IC	RCA	*CA3030 (-16)	1
IC	RCA	*CA3036 (-17)	1
IC	SIGNETICS	SG310	1
IC	NATIONAL SEMICONDUCTOR	NS7400	1
IC	NATIONAL SEMICONDUCTOR	NS7402	1
IC	NATIONAL SEMICONDUCTOR	NS7404	1
IC	NATIONAL SEMICONDUCTOR	NS7410	1
IC	NATIONAL SEMICONDUCTOR	NS7420	1
IC	NATIONAL SEMICONDUCTOR	NS7430	1
IC	NATIONAL SEMICONDUCTOR	NS7486	1
IC	NATIONAL SEMICONDUCTOR	NS74107	1
IC	NATIONAL SEMICONDUCTOR	LM301A	1
IC	FAIRCHILD	7805393	1
IC	FAIRCHILD	* $\mu$ A709C (-14)	1
IC	FAIRCHILD	* $\mu$ A709C (-13)	1
LAMP	MURA	L28/40	1
SINE MODULE	WAVETEK	130-011	1
TRANSISTOR	FAIRCHILD	2N2905A	1
TRANSISTOR	FAIRCHILD	2N2905	1
TRANSISTOR	FAIRCHILD	2N3299	1
TRANSISTOR	FAIRCHILD	2N3646	2
TRANSISTOR	FAIRCHILD	2N3638	1

DESCRIPTION	MANUFACTURER	PART NO.	QTY
TRANSISTOR	FAIRCHILD	2N3638A	1
TRANSISTOR	FAIRCHILD	2N3642	1
TRANSISTOR	FAIRCHILD	L08	1
TRANSISTOR	FAIRCHILD, MOTOROLA	2N3640	1
TRANSISTOR	FAIRCHILD	MPS L08	1
TRANSISTOR	FAIRCHILD	2N2369	1
MATCHED			
TRANSISTOR	FAIRCHILD	*2N2905 (—8)	2
MATCHED			
TRANSISTOR	FAIRCHILD	*2N3646 (—11)	2
MATCHED			
TRANSISTOR	FAIRCHILD	*2N3638 (—9)	2
MATCHED			
TRANSISTOR	MOTOROLA	*2N3640 (—10)	2
TRANSISTOR	MOTOROLA	MPS3640	1
TRANSISTOR	MOTOROLA	2N3903	1
TRANSISTOR	MOTOROLA	2N3905	1
TRANSISTOR	SPRAGUE	TD101	1
TRANSISTOR	TEXAS INST	*TIP 29	1
TRANSISTOR	TEXAS INST	*TIP 30	1

\* Denotes special parts that should be ordered from Wavetek. These parts have been tested or selected by Wavetek for optimum performance.

#### CROSS REFERENCE FOR DRAWING NUMBERS

Drawings	Old Number	New Number	Drawings	Old Number	New Number
Chassis Assembly	132-000	0102-00-0281	Logic Assembly	132-013	0101-00-0041
Chassis Schematic	132-200	0004-00-0022	Logic Schematic	132-213	0103-00-0041
Chassis Parts List	*	1101-00-0022	Logic Parts List	*	1100-00-0041
Bracket Assembly	130-001	0102-00-0324	Output Attenuator Assembly	142-003	1202-00-0008
Bracket Parts List	*	1101-00-0065	Output Attenuator Schematic	142-203	*
			Output Attenuator Parts List	*	*
Main Board Assembly	132-010	0101-00-0039	S/N - N/S (dB) Attenuator		
Main Board Schematic	132-210	0103-00-0039	Assembly	132-001	1202-00-0003
Main Board Parts List	*	1101-00-0039	S/N - N/S (dB) Attenuator		
Amplifier Assembly	132-012	0101-00-0040	Parts List	*	*
Amplifier Schematic	132-212	0103-00-0040			
Amplifier Parts List	*	1100-00-0040	Freq Sw Assembly	132-002	1202-00-0004
			Freq Sw Parts List	*	*

\*Same as Assembly Number





DESCRIPTION	MANUFACTURER	PART NO.	QTY
TRANSISTOR	FAIRCHILD	2N3638A	1
TRANSISTOR	FAIRCHILD	2N3642	1
TRANSISTOR	FAIRCHILD	L08	1
TRANSISTOR	FAIRCHILD, MOTOROLA	2N3640	1
TRANSISTOR	FAIRCHILD	MPS L08	1
TRANSISTOR	FAIRCHILD	2N2369	1
MATCHED			
TRANSISTOR	FAIRCHILD	*2N2905 (—8)	2
MATCHED			
TRANSISTOR	FAIRCHILD	*2N3646 (—11)	2
MATCHED			
TRANSISTOR	FAIRCHILD	*2N3638 (—9)	2
MATCHED			
TRANSISTOR	MOTOROLA	*2N3640 (—10)	2
TRANSISTOR	MOTOROLA	MPS3640	1
TRANSISTOR	MOTOROLA	2N3903	1
TRANSISTOR	MOTOROLA	2N3905	1
TRANSISTOR	SPRAGUE	TD101	1
TRANSISTOR	TEXAS INST	*TIP 29	1
TRANSISTOR	TEXAS INST	*TIP 30	1

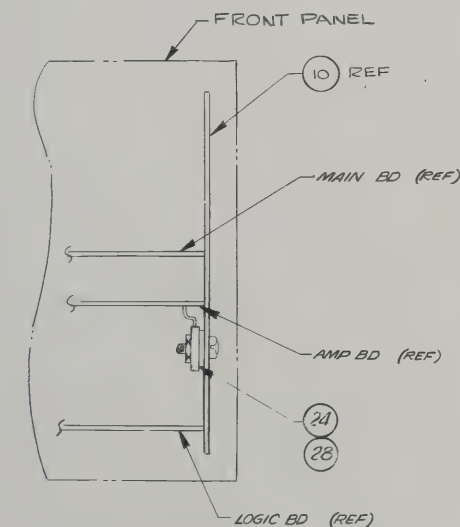
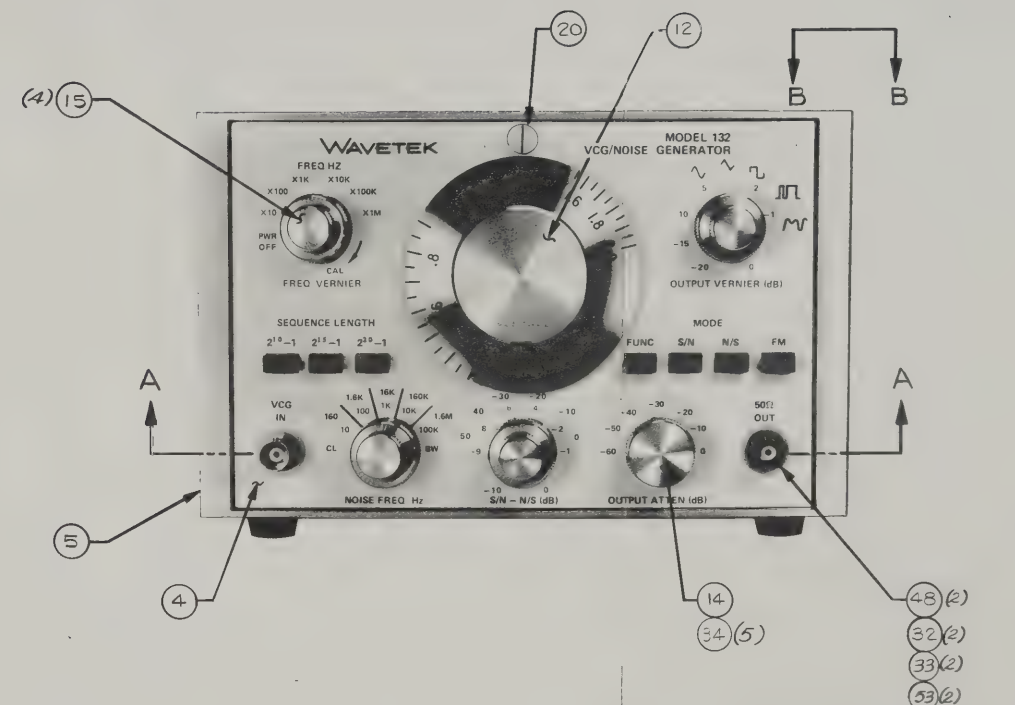
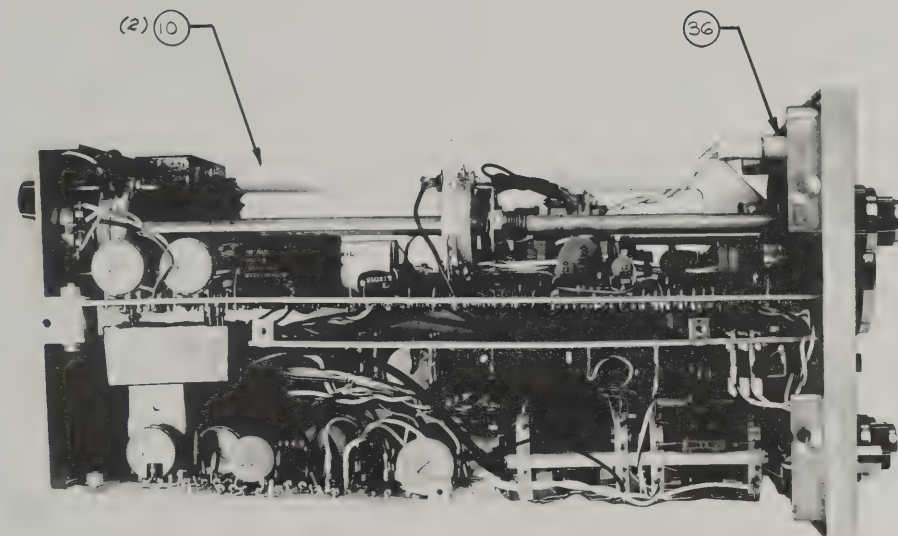
\* Denotes special parts that should be ordered from Wavetek. These parts have been tested or selected by Wavetek for optimum performance.

#### CROSS REFERENCE FOR DRAWING NUMBERS

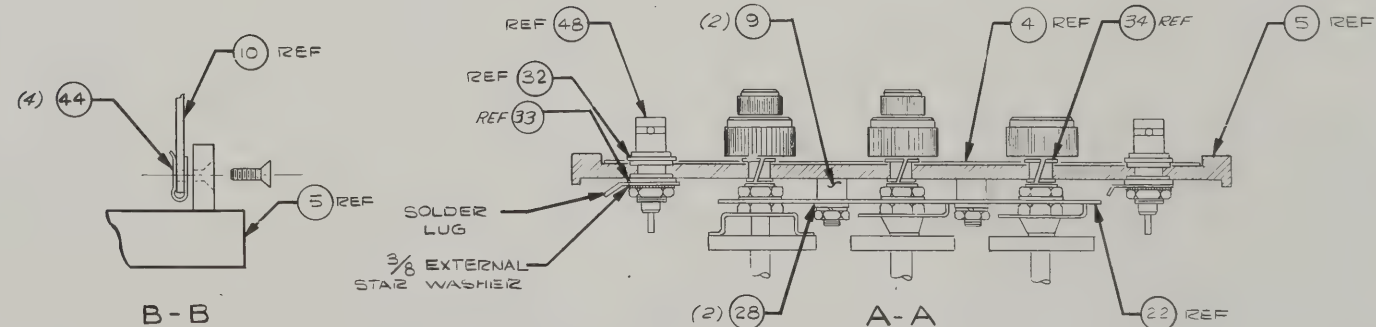
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Chassis Assembly	132-000	0102-00-0281	Logic Assembly	132-013	0101-00-0041
Chassis Schematic	132-200	0004-00-0022	Logic Schematic	132-213	0103-00-0041
Chassis Parts List	*	1101-00-0022	Logic Parts List	*	1100-00-0041
Bracket Assembly	130-001	0102-00-0324	Output Attenuator Assembly	142-003	1202-00-0008
Bracket Parts List	*	1101-00-0065	Output Attenuator Schematic	142-203	*
			Output Attenuator Parts List	*	*
Main Board Assembly	132-010	0101-00-0039			
Main Board Schematic	132-210	0103-00-0039	S/N - N/S (dB) Attenuator		
Main Board Parts List	*	1101-00-0039	Assembly	132-001	1202-00-0003
			S/N - N/S (dB) Attenuator		
Amplifier Assembly	132-012	0101-00-0040	Parts List	*	*
Amplifier Schematic	132-212	0103-00-0040			
Amplifier Parts List	*	1100-00-0040	Freq Sw Assembly	132-002	1202-00-0004
			Freq Sw Parts List	*	*

\*Same as Assembly Number





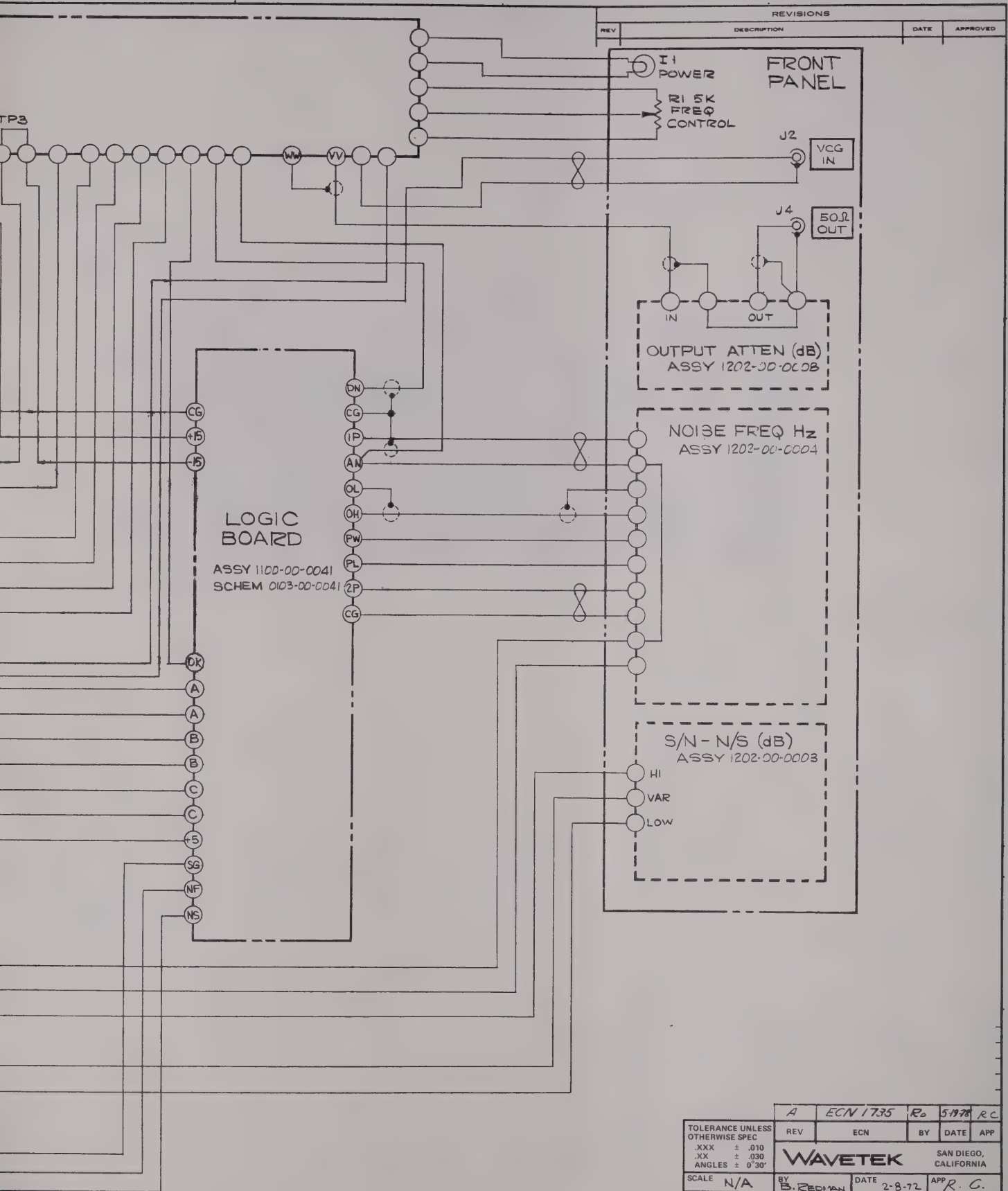
IC3 INSTALLATION  
(VIEWED FROM FRONT PANEL)



F	ECN 1482	RO 10/2/76
E	ECN 1482	RO 10/2/76
D	ECN 1482	RO 10/2/76
C	ECN 1482	RO 10/2/76
B	ECN 1482	RO 10/2/76
A	ECN #422	B2 4-2-72

tolerance unless otherwise specified	rev	ecn	by	date	app
.XXX ± .010 .XX ± .030					
scale N/A	by B. REIDMAN	date 12 FEB 76	app		
material					
N/A					
finish					
N/A					
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WAVETEK			san diego, calif		
by	B REEDMAN	date	03 FEB 76	app	
title					
CHASSIS ASSY					
model no.	dwg no.		rev		
132	0102-00-0231		F		
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A				
REV	ECN	BY	DATE	APP
<b>WAVETEK</b> SAN DIEGO, CALIFORNIA				
SCALE	N/A	DATE	2-8-72	APP R. C.
MATERIAL	N/A	TITLE	SCHEMATIC - INSTRUMENT	
FINISH	N/A	MODEL NO.	132	DWG NO. 0004-00-0022
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REV	ECN	BY	DATE	APP
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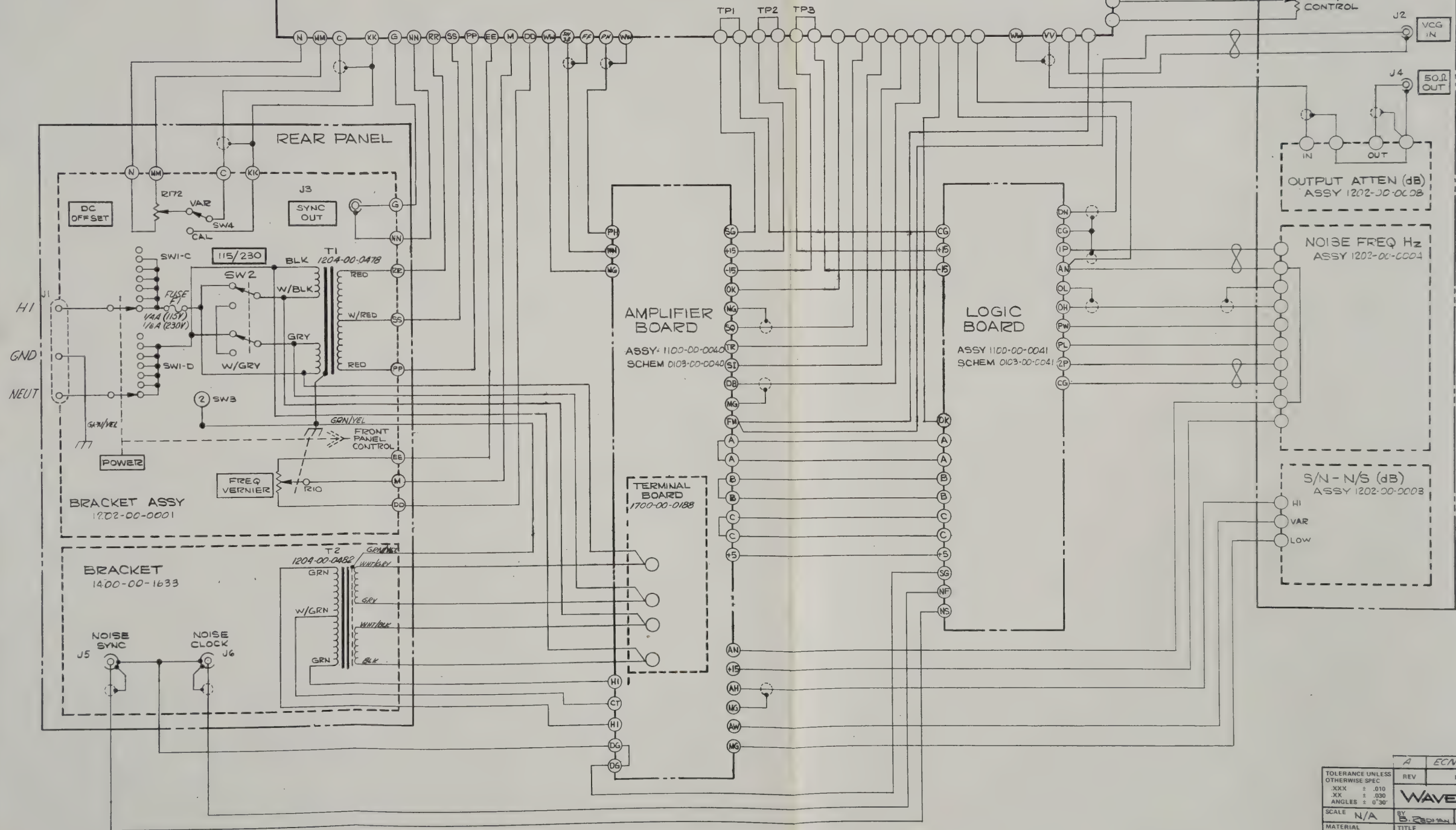
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SSY DRWG, CHASSIS	0102-00-0281	WVTK	0102-00-0281	1
AL ASSY	130-333-4	WVTK	1201-00-0008	1
OVER ASSY	130-353-1	WVTK	1201-00-0017	1
ANEL, REAR FROM: 1400-00-1022	132-303	WVTK	1400-00-1049	1
AIL, SIDE	130-304	WVTK	1400-00-1073	2
ANEL, FT	132-300	WVTK	1400-00-1620	1
PACER	132-306	WVTK	1400-00-1643	2
ASTING, FRONT FROM: 1400-00-1681	132-301	WVTK	1400-00-1729	1
ASTING, REAR FROM: 1400-00-1681	132-304	WVTK	1400-00-1759	1
CREW	135-302	WVTK	1400-00-2004	2
INDICATOR, DIAL	141-317	WVTK	1400-00-2020	1
NSULATOR, MICA	142-311	WVTK	1400-00-2080	1
D. LABEL	1400-00-9100	WVTK	1400-00-9100	1
IC CONN	KC-7946	KING	2100-01-0002	2
OLDER LUG	1497	SMITH	2100-04-0012	2
USHING NYLINER	4L2FF	THOMN	2800-01-0002	5
SSIS	ASSEMBLY NO. 1101-00-0022  PAGE: 1			REV H

PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
PEEDNUT, TYPE/U	C8091-632-4	TINN	2800-09-0004	4
RESS BOLT	PB-6-32-SM-10	ROSAN	2800-09-0009	2
LUG BUTTON	PC47291	UNCAR	2800-09-0010	2
AST, CHASSIS	1591-B11	USECO	2800-09-0021	4
APTIVE SCREW	CA1376-10-3-9	TRIDR	2800-23-0001	2
ASHER, SHOULDER	2660	SMITH	2800-26-0001	3
ASHER, SHOULDER	2668	SMITH	2800-27-0004	2
LON FLAT WASHER	2264-N-385	AMTOM	2800-28-0005	2
ETAINING RING	5305-31	TRURC	2800-36-0002	1
SSIS	ASSEMBLY NO. 1101-00-0022  PAGE: 2			REV H

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	<b>WAVETEK</b> SAN DIEGO • CALIFORNIA			
MATERIAL	PROJ ENGR					
FINISH WAVETEK PROCESS	RELEASE	APPROV	TITLE PARTS LIST STD CHASSIS			
	TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ±.010 ANGLES ±1° XX ±.030					
	DO NOT SCALE DWG	MODEL NO.	132	DWG NO.	1101-00-0022	REV
SCALE	CODE IDENT	23338	SHEET	OF		

MAIN BOARD  
ASSY 0101-00-0039  
SCHEM 0103-00-0039



REVISIONS				
REV	DESCRIPTION	DATE	APPROVED	
1	POWER			
2	5K FREQ CONTROL			
3	VCG IN			
4	50Ω OUT			
5	OUTPUT ATTEN (dB) ASSY 1202-00-0008			
6	NOISE FREQ Hz ASSY 1202-00-0004			
7	S/N - N/S (dB) ASSY 1202-00-0003			
8	HI			
9	VAR			
10	LOW			

TOLERANCE UNLESS OTHERWISE SPEC	BY	DATE	APP
.XXX ± .010	B. R. BROWN	2-8-72	R. C.
.XX ± .030			
ANGLES ± 0°30'			
SCALE N/A			
MATERIAL N/A			
FINISH N/A			

ECN 1735	Ro 5177	RC
WAVETEK		
SAN DIEGO, CALIFORNIA		
TITLE SCHEMATIC-INSTRUMENT		
MODEL NO. 132	DWG NO. 0004-00-0022	REV A
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REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
NONE	ASSY DRWG. CHASSIS	0102-00-0281	WVTK	0102-00-0281	1
12	DIAL ASSY	130-333-4	WVTK	1201-00-0008	1
17	COVER ASSY	130-353-1	WVTK	1201-00-0017	1
7	PANEL, REAR FROM 1400-00-1022	132-303	WVTK	1400-00-1049	1
10	RAIL, SIDE	130-304	WVTK	1400-00-1073	2
4	PANEL, FT	132-300	WVTK	1400-00-1620	1
9	SPACER	132-306	WVTK	1400-00-1643	2
5	CASTING, FRONT FROM 1400-00-1681	132-301	WVTK	1400-00-1729	1
8	CASTING, REAR FROM 1400-00-1681	132-304	WVTK	1400-00-1759	1
2	SCREW	135-302	WVTK	1400-00-2004	2
20	INDICATOR, DIAL	141-317	WVTK	1400-00-2020	1
24	INSULATOR, MICA	142-311	WVTK	1400-00-2080	1
NONE	I.D. LABEL	1400-00-9100	WVTK	1400-00-9100	1
48	BNC CONN	KC-7946	KING	2100-01-0002	2
53	SOLDER LUG	1497	SMITH	2100-04-0012	2
34	BUSHING NYLINER	4L2FF	THOMN	2800-01-0002	5
TITLE STD CHASSIS		ASSEMBLY NO. 1101-00-0022  PAGE: 1			REV H

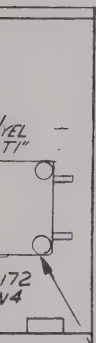
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25	PFESS BOLT	P8-6-32-SM-10	ROSAN	2800-09-0009	2
27	PLUG BUTTON	PC47291	UNCAR	2800-09-0010	2
52	FAST, CHASSIS	1591-B11	USECO	2800-09-0021	4
37	CAPTIVE SCREW	CA1376-10-3-9	TRIDR	2800-23-0001	2
28	WASHER, SHOULDER	2660	SMITH	2800-26-0001	3
32	WASHER, SHOULDER	2668	SMITH	2800-27-0004	2
33	NYLON FLAT WASHER	2264-N-385	AMTOM	2800-28-0005	2
50	RETAINING RING	5305-31	TRURC	2800-36-0002	1
WAVETEK PARTS LIST		TITLE STD CHASSIS	ASSEMBLY NO. 1101-00-0022  PAGE: 2		REV H

NOTE: UNLESS OTHERWISE SPECIFIED

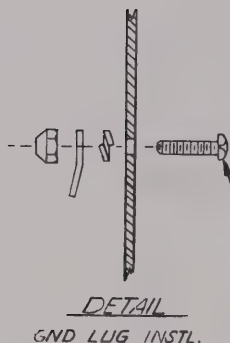
REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	WAVETEK SAN DIEGO - CALIFORNIA		
MATERIAL	PROJ ENGR		TITLE PARTS LIST STD CHASSIS		
	RELEASE	APPROV			
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES .1° XX ± .030				
	DO NOT SCALE DWG	MODEL NO.	132	DWG NO. 1101-00-0022	REV H
	SCALE	CODE IDENT	23338	SHEET	OF



POWER CORD  
-HEYCO BUSHING.

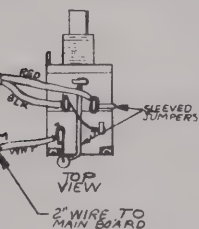
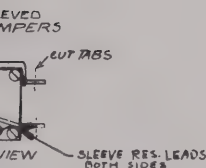


SEE  
DETAIL DC OFFSET SWITCH  
(FROM MAIN BOARD HARNESS)



6-32 X 1/8 FN. HD. SCREW  
#6 SPLIT LOCKWASHER  
1485-6 SOLDER LUG  
#6 SELFLOCKING NUT

NOTE: ALL CONNECTIONS TO BE  
MECHANICALLY SECURE TO  
LUGS PRIOR TO SOLDERING  
GROUND WIRES



SLEEVING  
24 GA TEFLON  
WIRING  
36

K	ECN 1735	R0	5-14-78	RC
J	DDC 41462	DC	7-16-6	
H	ECN 1346	RU	10-2-75	un
G	ECN 1242	RO	4-6-75	BA
F	ECN 878	BA	5-17-74	RC
E	ECN 501	SL	7-4-72	RC
D	J1 WAS AC3-G	SL	2-15-72	SL
C	ECN 341	11G	4-15-72	28
B	COP 29	11G	2-16-72	28
A	ECN 283	20	11-4-68	WD

tolerance unless otherwise specified	rev	ecn	by	date	app.
.XXX ± .010 .XX ± .030					
scale N/A	WAVETEK san diego, calif				
material	by BOCHICHIO	date 7-21-69	app. 2	GJS	
N/A	title ASS'Y, BRACKET				
finish	model no. 130-136	dwg no. 0102-00-0324	rev K	this document contains proprietary information and design rights belonging to WAVETEK and may not be used or reproduced for any reason except calibration, operation and maintenance without written authorization.	
N/A					

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REV	ECN	BY	DATE	APP
-----	-----	----	------	-----

PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
BSY DRWG, BRACKET	0102-00-0324	WVTK	0102-00-0324	1
TRANSFORMER	130-500	WVTK	1204-00-0478	1
RKT	130-306	WVTK	1400-00-1093	1
EAT SINK	130-311	WVTK	1400-00-1163	1
INSULATOR	740-307	WVTK	1400-00-4790	1
RKT, REAR MOUNTING	1400-00-8813	WVTK	1400-00-8813	1
NC CONN	KC-7946	KING	2100-01-0002	1
OLDER LUG	1497	SMITH	2100-04-0012	1
OLDER LUG	1485-6	SMITH	2100-04-0025	2
USE, 1/4A, 250V, S-B	313.250	LITFU	2400-05-0008	1
USE HOLD	031.1653/031.1666	SCHUR	2400-05-0012	1
INSERT # 6	74-11-106-13	SDTCD	2800-09-0017	4
ASHER, SHOULDER	2668	SMITH	2800-27-0004	2
TRAIN RELIEF BUSH	SR6W-1	HEYCD	2800-37-0003	1
WITCH ASSY SLIDE	46256-LF	SWCFT	5105-00-0002	1
OLDER GUARD	46256-LF-SG	SWCFT	5105-09-0001	1
WR CORD	0-7789-003-QY	PACRD	6001-80-0004	1
ASSY		ASSEMBLY NO. 1101-00-0065		REV K
		PAGE: 1		

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	<b>WAVETEK</b> SAN DIEGO • CALIFORNIA TITLE PARTS LIST BRACKET ASSY		
MATERIAL	PROJ ENGR				
FINISH WAVETEK PROCESS	RELEASE	APPROV	TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° .XX ±.030 DO NOT SCALE DWG SCALE		
			MODEL NO.	DWG NO.	REV
			132	1101-00-0065	K
			CODE IDENT	SHEET OF	
			23338		





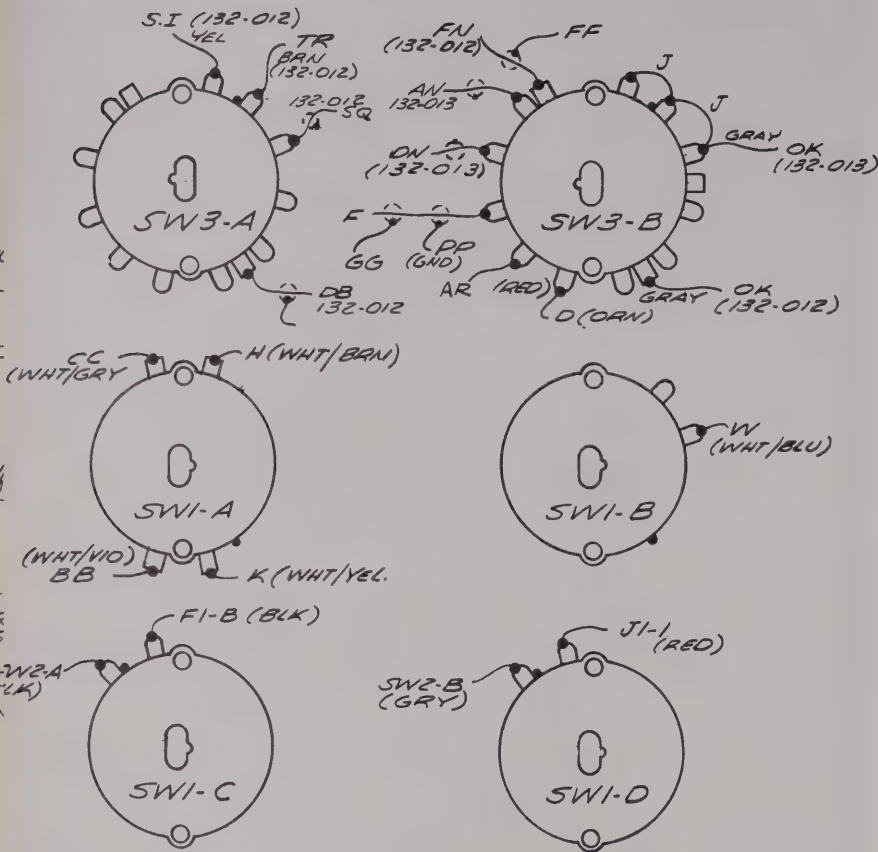
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REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFG#-PART-NO	MFG#	WAVETEK NO.	QTY/P
NONE	ASSY DRWG, BRACKET	0102-00-0324	WVTK	0102-00-0324	1
T1	TRANSFORMER	130-500	WVTK	1204-00-0478	1
3	BRKT	130-306	WVTK	1400-00-1093	1
15	HEAT SINK	130-311	WVTK	1400-00-1163	1
14	INSULATOR	740-307	WVTK	1400-00-4790	1
1	BRKT, REAR MOUNTING	1400-00-8813	WVTK	1400-00-8813	1
J3	BNC CONN	KC-7946	KING	2100-01-0002	1
20	SOLDER LUG	1497	SMITH	2100-04-0012	1
21	SOLDER LUG	1485-6	SMITH	2100-04-0028	2
6	FUSE, 1/4A, 250V, S-B	313.250	LITFU	2400-05-0006	1
7	FUSE HOLD	031.1653/031.1666	SCHUR	2400-05-0012	1
24	INSERT # 6	74-11-106-13	SDTCO	2800-09-0017	4
17	WASHER, SHOULDER	2668	SMITH	2800-27-0004	2
NONE	STRAIN RELIEF BUSH	SR6W-1	HEYCO	2800-37-0003	1
13	SWITCH ASSY SLIDE	46256-LF	SWCFT	5105-00-0002	1
12	SOLDER GUARD	46256-LF-SG	SWCFT	5105-09-0001	1
51	PWR CORD	0-7789-008-QY	PACRD	6001-B0-0004	1
WAVETEK PARTS LIST		TITLE BRACKET ASSY	ASSEMBLY NO. 1101-00-0065		REV K
		PAGE 1			

NOTE: UNLESS OTHERWISE SPECIFIED

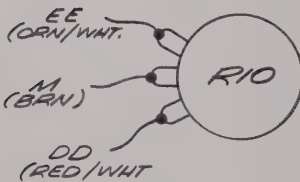
REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	WAVETEK SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ ENGR		TITLE PARTS LIST BRACKET ASSY	
	RELEASE APPROV			
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES .1° XX .030			
	DO NOT SCALE DWG	MODEL NO. 132	DWG NO. 1101-00-0065	REV K
SCALE				
	CODE IDENT 23338	SHEET OF		

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



#### NOTES FOR SW1

SWITCH APPEARS AS VIEWED FROM FRONT OF BOARD. THE FRONT OR NEAREST WAFER IS "A"



8.  $\longleftrightarrow$  = MATCHED TRANSISTORS
7.  $\star\star$  = MATCHED SET
6.  $\#$  = SELECTED VALUE
5. PH, FM,  $\star$  = FARSIDE
4. A = AMP PINS NEARSIDE
3. A $\star$  = AMP PINS FARSIDE
2. T $\star$ , T $\star$  = TERMINALS FARSIDE
1. T' = TERMINALS NEARSIDE

NOTES

M	ECN 1353	PVB	9/5/78	
L	ECN 1347	RO	10/7/78	RC
K	ECN 1291	RO	6-6-78	RC
J	ECN 1223	RO	5-4-78	RC
H	ECN 1216	RO	2-25-78	RC
G	ECN 1181	RO	7-17-77	RC
F	ECN 944	BA	6-18-74	RC
E	ECN 770	BA	10-26-73	RC
D	ECN 726	BA	9-5-73	RC
C	ECN 685	Cgx	7-10-73	RC
B	ECN 441	5-2-72	9-23-72	RC
A	ECN #421	B, R	4-21-72	RC

TOLERANCE UNLESS OTHERWISE SPEC	REV	ECN	BY	DATE	APP
.XXX $\pm$ .010 .XX $\pm$ .030 ANGLES $\pm$ 0°30'					
SCALE N/A	BY GRAY	DATE 2-14-78	APP R. C.		
MATERIAL N/A	TITLE ASSY MAIN BOARD				
FINISH N/A	MODEL NO. 132	DWG NO. SHT 1 OF 2	REV M		
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND DESIGN RIGHTS BELONGING TO WAVETEK AND MAY NOT BE REPRODUCED FOR ANY REASON EXCEPT CALIBRATION, OPERATION, AND MAINTENANCE WITHOUT WRITTEN AUTHORIZATION.					











				REV	ECN	BY	DATE	APP		
Q-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT	REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT	
0-110 97 0081 081 82-2 -222 67-1-SB-M 67-1-SB+0-M-9 7-7876 207 23N 60		1509-80-0005		R189						
				R030 R075 R076 R130 R160	RES, MF, 1/8W, 1%, 1K	RN55D-1001F	TRW	4701-03-1001	5	
				R178	RES, MF, 1/8W, 1%, 10K	RN55D-1002F	TRW	4701-03-1002	1	
				R086 R087 R155 R156 R157 R158	RES, MF, 1/8W, 1%, 10	RN55D-10R0F	TRW	4701-03-1009	6	
				R85	RES, MF, 1/8W, 1%, 124	RN55D-1240F	TRW	4701-03-1240	1	
				R141	RES, MF, 1/8W, 1%, 140	RN55D-1400F	TRW	4701-03-1400	1	
				R124	RES, MF, 1/8W, 1%, 150	RN55D-1500F	TRW	4701-03-1500	1	
				R15 R23 R98 R99	RES, MF, 1/8W, 1%, 1.5K	RN55D-1501F	TRW	4701-03-1501	4	
				R5	RES, MF, 1/8W, 1%, 15K	RN55D-1502F	TRW	4701-03-1502	1	
				R145 R153	RES, MF, 1/8W, 1%, 1.78K	RN55D-1781F	TRW	4701-03-1781	2	
				R114 R115	RES, MF, 1/8W, 1%, 18.2K	RN55D-1822F	TRW	4701-03-1822	2	
				R139 R140 R188	RES, MF, 1/8W, 1%, 21.5	RN55D-21R5F	TRW	4701-03-2159	3	
				R034 R035 R180 R36	RES, MF, 1/8W, 1%, 2.21K	RN55D-2211F	TRW	4701-03-2211	4	
				R006 R146	RES, MF, 1/8W, 1%, 221K	RN55D-2213F	TRW	4701-03-2213	2	
				R033 R074 R078 R151 R32	RES, MF, 1/8W, 1%, 249	RN55D-2490F	TRW	4701-03-2490	5	
			R31 R54 R61	RES, MF, 1/8W, 1%, 27.4K	RN55D-2742F	TRW	4701-03-2742	3		
ASSEMBLY NO. 1100-00-0039  PAGE: 3			REV N	WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039  PAGE: 5		REV N

Q-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT	REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT				
R100	BECK	4600-01-0103	2	R024 R073 R100 R112 R113	RES, MF, 1/8W, 1%, 2.87K	RN55D-2871F	TRW	4701-03-2871	5				
R1K	BECK	4600-01-0209	1	R64 R70	RES, MF, 1/8W, 1%, 3.01K	RN55D-3011F	TRW	4701-03-3011	2				
-R1A	WVTK	4600-01-0305	1	R084 R137 R142	RES, MF, 1/8W, 1%, 316	RN55D-3160F	TRW	4701-03-3160	3				
10032R103UA	AB	4600-01-0311	1	R187	RES, MF, 1/8W, 1%, 33.2	RN55D-33R2F	TRW	4701-03-3329	1				
R100K	BECK	4600-01-0402	6	R120 R122	RES, MF, 1/8W, 1%, 3.83K	RN55D-3831F	TRW	4701-03-3831	2				
R200	BECK	4600-02-0101	2	R52 R63	RES, MF, 1/8W, 1%, 392	RN55D-3920F	TRW	4701-03-3920	2				
R500	BECK	4600-05-0104	3	R013 R101	RES, MF, 1/8W, 1%, 3.92K	RN55D-3921F	TRW	4701-03-3921	2				
R0CF-4R7	STKPL	4700-25-0479	2	R65 R71 R91 R94	RES, MF, 1/8W, 1%, 464	RN55D-4640F	TRW	4701-03-4640	4				
R0CF-6R8	STKPL	4700-25-0689	2	R002 R017 R026 R037 R040 R169	RES, MF, 1.8W, 1%, 46.4	RN55D-46R4F	TRW	4701-03-4649	6				
R0CF-8R2	STKPL	4700-25-0829	2	R066 R069 R088 R089 R092 R093 R096 R097 R107	RES, MF, 1/8W, 1%, 4.75K	RN55D-4751F	TRW	4701-03-4751	9				
R0CF-395	STKPL	4700-25-3904	2										
R0CF-475	STKPL	4700-25-4704	1	R55 R60	RES, MF, 1/8, 1%, 499	RN55D-4990F	TRW	4701-03-4990	2				
R0CF-564	STKPL	4700-25-5603	1	R003 R144 R190	RES, MF, 1/8W, 1%, 4.99K	RN55D-4991F	TRW	4701-03-4991	3				
R0CF-683	STKPL	4700-25-6804	1	R138	RES, MF, 1/8W, 1%, 56.2	RN55D-56R2F	TRW	4701-03-5629	1				
R0CF-824	STKPL	4700-25-8203	1	R132 R134	RES, MF, 1/8W, 1%, 576	RN55D-5760F	TRW	4701-03-5760	2				
R20F-470	STKPL	4700-45-0470	2	R053 R062 R105	RES, MF, 1/8W, 1%, 6.19K	RN55D-6191F	TRW	4701-03-6191	3				
R5D-1000F	TRW	4701-03-1000	5										
ASSEMBLY NO. 1100-00-0039  PAGE: 4				REV N		WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039  PAGE: 6		REV N	

REMOVE ALL BURRS AND BREAK SHARP EDGES		DRAWN	DATE	<b>WAVETEK</b> SAN DIEGO • CALIFORNIA TITLE PARTS LIST MAIN	
MATERIAL		PROJ ENGR			
		RELEASE APPROV			
		TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° XX ±.030			
FINISH WAVETEK PROCESS		DO NOT SCALE DWG		MODEL NO.	132
		SCALE		DWG NO.	1100-00-0039
				REV	N
				EDGE IDENT	23338
				SHEET	1 OF 2



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REV	ECN	BY	DATE	APP
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DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
S	MPS-L08	FAIR	4902-00-0080	2
S	TIP-29	TI	4902-00-0290	1
S	TIP-30	TI	4902-00-0300	1
S	TD-101	SPRAG	4902-00-1010	1
S	MPS-2369	FAIR	4902-02-3690	2
S, M/PR, 2N2905A 2: 4901-02-9051	130-501-8	WVTK	4998-00-0011	1
S, M/PR, 2N3638A 2: 4901-03-6381	130-501-9	WVTK	4998-00-0012	1
S, M/PR, 2N3640 2: 4901-03-6400	130-501-10	WVTK	4998-00-0013	1
S, M/PR, 2N3646 2: 4901-03-6460	130-501-11	WVTK	4998-00-0014	2
CH ASSY ROTARY	132-SW1	WVTK	5104-00-0013	1
R	T-106	CTS	5104-02-0002	1
R	133-SW1-1	WVTK	5104-02-0008	1
CH STOP	212-33-006	CTS	5104-07-0002	1
R : 5104-02-0007	5104-98-0001	WVTK	5104-98-0001	2
NT MOD	5104-99-0043	WVTK	5104-99-0043	1
ASSEMBLY NO. 1100-00-0039  PAGE: 9				REV N

DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
5104-01-0010	AD 811	ANDEV	7000-08-1100	1
LASS I, CA-3030 1: 7000-30-3000	130-501-15	WVTK	7200-00-0001	1
LASS II, CA-3030 1: 7000-30-3000	130-501-16	WVTK	7200-00-0002	1
LASS I, CA-3039 1: 7000-30-3900	130-501-18	WVTK	7200-00-0004	1
LASS I, MA-709 1: 7000-07-0900	130-501-13	WVTK	7200-00-0005	2
LASS II, MA-709 1: 7000-07-0900	130-501-14	WVTK	7200-00-0006	2
ASSEMBLY NO. 1100-00-0039  PAGE: 10				REV N

NOTE: UNLESS OTHERWISE SPECIFIED

MOVE ALL BURRS D BREAK SHARP EDGES SERIAL	DRAWN	DATE	<b>WAVETEK</b> SAN DIEGO • CALIFORNIA TITLE PARTS LIST MAIN	
	PROJ ENGR			
SH WAVETEK PROCESS	RELEASE APPROV		MODEL NO. 132 DWG NO. 1100-00-0039 REV N	
	TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° .XX ±.030			
	DO NOT SCALE DWG			
	SCALE			
	CODE IDENT 23338	SHEET 2 OF 2		

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REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
NONE	ASSY DRWG. MAIN	0101-00-0039	WVTK	0101-00-0039	1
NONE	SCHEMATIC, MAIN	0103-00-0039	WVTK	0103-00-0039	1
A1	SINE MOD	130-011	WVTK	1200-00-0001	1
NONE	BLOCK, MOUNTING	130-305	WVTK	1400-00-1083	2
161	BLOCK, SUPPORT	130-328	WVTK	1400-00-1263	1
NONE	PLATE, SW	008-004	WVTK	1400-00-2130	1
C03 C22	CAP. CER. 10PF, 1KV	DD-103	CRL	1500-01-0011	2
C70	CAP. CER. 100PF, 1KV	DD-101	CRL	1500-01-0111	1
C63 C66	CAP. CER. .01MF, 50V	CK-103	CRL	1300-01-0310	2
C2 C25 C26 C34 C35 C36 C37 C4 C44 C45 C57 C58 C59 C60 C7 C9	CAP. CER. .1MF, 20V	UK20-104	CRL	1500-01-0413	16
C67 C68	CAP. CER. 150PF, 1KV	DD-151	ARCO	1500-01-5111	2
C23 C24 C55	CAP. CER. 22PF, 1KV	DD-220	ARCO	1500-02-2011	3
C08 C3 C50 C51	CAP. CER. 220PF, 1KV	DD-221	ARCO	1500-02-2111	4
C56	CAP. CER. 30PF, 1KV	DD-300	CRL	1500-03-0001	1
C38 C43	CAP. CER. 33PF, 1KV	DD-330	CRL	1500-03-3011	2
C63	CAP. CER. 330PF, 1KV	DD-331	ARCO	1500-03-3111	1
C39 C42 C69	CAP. CER. 47PF, 1KV	DD-470	ARCO	1500-04-7011	3
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 1	
				REV N	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
	CAP. SET. POLYC MIXED MATCHED SET			1509-80-0005	
C19	CAP. POLYC, 1MF, 100V PART OF 1509-80-0005 QTY(1)				
C20 C54	CAP. POLYC, 5HF, 100V PART OF 1509-80-0005 QTY(2)				
NONE	MAIN	130-110	WVTK	1700-00-0037	1
NONE	SOLDER LUG	1497	SMITH	2100-04-0012	1
152	TERM	2000B1	USECO	2100-05-0009	6
151	TERM	2010B1	USECO	2100-05-0011	5
153	PIN, MALE	611B2-2	AMP	2100-05-0020	12
NONE	KNOB	020-222	ELMA	2400-01-0001	1
14	STD KNOB	R8-67-1-SB-M	ROGAN	2400-01-0008	1
15	COAX KNOB SET	R8-67-1-SB+0-M-9	ROGAN	2400-01-0009	4
11	LAMP	CM7-7B76	CHMIN	2400-02-0013	1
148	HEAT SINK	NF-207	WAKE	2800-11-0001	2
149	TRANSIPAD	10123N	METRS	2800-11-0003	9
150	TRANSIPAD	10160	METRS	2800-11-0004	2
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 3	
				REV N	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
R189					
R030 R075 R076 R130 R160	RES. MF, 1/8W, 1%, 1K	RN55D-1001F	TRW	4701-03-1001	5
R178	RES. MF, 1/8W, 1%, 10K	RN55D-1002F	TRW	4701-03-1002	1
R086 R087 R155 R156 R157 R158	RES. MF, 1/8W, 1%, 10	RN55D-10R0F	TRW	4701-03-1009	6
R85	RES. MF, 1/8W, 1%, 124	RN55D-1240F	TRW	4701-03-1240	1
R141	RES. MF, 1/8W, 1%, 140	RN55D-1400F	TRW	4701-03-1400	1
R124	RES. MF, 1/8W, 1%, 150	RN55D-1500F	TRW	4701-03-1500	1
R13 R25 R98 R99	RES. MF, 1/8W, 1%, 1.5K	RN55D-1501F	TRW	4701-03-1501	4
R5	RES. MF, 1/8W, 1%, 15K	RN55D-1502F	TRW	4701-03-1502	1
R145 R153	RES. MF, 1/8W, 1%, 1.78K	RN55D-1781F	TRW	4701-03-1781	2
R114 R115	RES. MF, 1/8W, 1%, 18.2K	RN55D-1822F	TRW	4701-03-1822	2
R139 R140 R188	RES. MF, 1/8W, 1%, 21.5	RN55D-21R5F	TRW	4701-03-2159	3
R034 R035 R180 R36	RES. MF, 1/8W, 1%, 2.21K	RN55D-2211F	TRW	4701-03-2211	4
R006 R146	RES. MF, 1/8W, 1%, 221K	RN55D-2213F	TRW	4701-03-2213	2
R033 R074 R078 R151 R32	RES. MF, 1/8W, 1%, 249	RN55D-2490F	TRW	4701-03-2490	5
R31 R54 R61	RES. MF, 1/8W, 1%, 27.4K	RN55D-2742F	TRW	4701-03-2742	3
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 5	
				REV N	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
C01 C06 C52 C53	CAP. CER. .005HF, 50V	CK-502	CRL	1500-05-0210	4
C40 C41	CAP. CER. 680PF, 1KV	DD-681	ARCO	1500-06-8111	2
C28 C33	CAP. MICA, 150PF, 500V	DM15-151J	ARCO	1500-11-5100	2
C29 C32	CAP. MICA, 300PF, 500V	DM15-301J	ARCO	1500-13-0100	2
C147	CAP. MICA, 56PF, 500V	DM15-560J	ARCO	1500-15-6000	1
C30 C31	CAP. MICA, 560PF, 300V	DM15-361J	ARCO	1500-15-6100	2
C13	CAP. MICA, 68PF, 500V	DM15-680J	ARCO	1500-16-8000	1
C15	CAP. 910PF, 100V, 1%	DM15-911F	ARCO	1500-19-1101	1
C12 C11 C46 C47 C61 C62	CAP. ELECT, 100MF, 16V	500D107G016DC7	SPRAG	1500-31-0101	6
C48 C49	CAP. ELECT, 1000MF, 35V	39D108G039GL6	SPRAG	1500-31-0212	2
C12 C16 C64	VARI, 4.5-23PF, 300V	503-001-37R	ERIE	1500-52-5000	3
	CAP. SET. POLYC MIXED MATCHED SET	130-501-6	WVTK	1509-80-0005	1
C17	CAP. POLYC, .01MF, 100V PART OF 1509-80-0005 QTY(1)				
C18	CAP. POLYC, .1MF, 100V PART OF 1509-80-0005 QTY(1)				
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 2	
				REV N	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
R56 R59	POT. TRIM, 100	91AR100	BECK	4600-01-0103	2
R104	POT. TRIM, 1K	91AR1K	BECK	4600-01-0209	1
R10	POT. CONT, 10K	130-R1A	WVTK	4600-01-0305	1
R172	POT. SWITCH, 10K	70K10032R103UA	AB	4600-01-0311	1
R008 R011 R022 R028 R128 R150	POT. TRIM, 100K	91AR100K	BECK	4600-01-0402	6
R126 R127	POT. TRIM, 200	91AR200	BECK	4600-02-0101	2
R004 R121 R133	POT. TRIM, 500	91AR500	BECK	4600-05-0104	3
R38 R39	RES. C, 1/2W, 5%, 4.7	RC200F-4R7	STKPL	4700-25-0479	2
R90 R95	RES. C, 1/2W, 5%, 6.8	RC200F-6R8	STKPL	4700-25-0689	2
R162 R163	RES. C, 1/2W, 5%, 8.2	RC200F-BR2	STKPL	4700-25-0829	2
R07 R23	RES. C, 1/2W, 5%, 3.9M	RC200F-395	STKPL	4700-25-3904	2
R12	RES. C, 1/2W, 10%, 4.7M	RC200F-475	STKPL	4700-25-4704	1
R143	RES. C, 1/2W, 10%, 560K	RC200F-564	STKPL	4700-25-5603	1
R184	RES. C, 1/2W, 10%, 6.8M	RC200F-685	STKPL	4700-25-6804	1
R29	RES. C, 1/2W, 10%, 820K	RC200F-B24	STKPL	4700-25-8203	1
R161 R164	RES. C, 2W, 5%, 47	RC420F-470	STKPL	4700-45-0470	2
R057 R058 R079 R080	RES. MF, 1/8W, 1%, 100	RN55D-1000F	TRW	4701-03-1000	5
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 4	
				REV N	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
R024 R073 R100 R112 R113	RES. MF, 1/8W, 1%, 2.87K	RN55D-2871F	TRW	4701-03-2871	5
R64 R70	RES. MF, 1/8W, 1%, 3.01K	RN55D-3011F	TRW	4701-03-3011	2
R084 R137 R142	RES. MF, 1/8W, 1%, 316	RN55D-3160F	TRW	4701-03-3160	3
R187	RES. MF, 1/8W, 1%, 33.2	RN55D-33R2F	TRW	4701-03-3329	1
R120 R122	RES. MF, 1/8W, 1%, 3.83K	RN55D-3831F	TRW	4701-03-3831	2
R52 R63	RES. MF, 1/8W, 1%, 392	RN55D-3920F	TRW	4701-03-3920	2
R013 R101	RES. MF, 1/8W, 1%, 3.92K	RN55D-3921F	TRW	4701-03-3921	2
R65 R71 R91 R94	RES. MF, 1/8W, 1%, 464	RN55D-4640F	TRW	4701-03-4640	4
R002 R017 R026 R037 R040 R169	RES. MF, 1/8W, 1%, 46.4	RN55D-46R4F	TRW	4701-03-4649	6
R066 R069 R088 R089 R092 R093 R096 R097 R107	RES. MF, 1/8W, 1%, 4.75K	RN55D-4751F	TRW	4701-03-4751	9
R55 R60	RES. MF, 1/8, 1%, 499	RN55D-4990F	TRW	4701-03-4990	2
R003 R144 R190	RES. MF, 1/8W, 1%, 4.99K	RN55D-4991F	TRW	4701-03-4991	3
R138	RES. MF, 1/8W, 1%, 56.2	RN55D-56R2F	TRW	4701-03-5629	1
R132 R134	RES. MF, 1/8W, 1%, 576	RN55D-5760F	TRW	4701-03-5760	2
R033 R062 R105	RES. MF, 1/8W, 1%, 6.19K	RN55D-6191F	TRW	4701-03-6191	3
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 6	
				REV N	

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	WAVETEK SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ ENGR		TITLE PARTS LIST MAIN	
	RELEASE APPROV			
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED XXX : 010 XX : 030			
	DO NOT SCALE DWG	MODEL NO.	DWG NO.	REV
SCALE		132	1100-00-0039	N
	CODE IDENT	23338	SHEET	1 OF 2

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REV ECN BY DATE APP

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/P
R16	RES. MF, 1/8W, 1%, 681	RN55D-6810F	TRW	4701-03-6810	1
R67 R68	RES. MF, 1/8W, 1%, 6.98K	RN55D-6981F	TRW	4701-03-6981	2
R182	RES. MF, 1/8W, 1%, 750	RN55D-7500F	TRW	4701-03-7500	1
R102 R131	RES. MF, 1/8W, 1%, 8.25K	RN55D-8251F	TRW	4701-03-8251	2
R081 R123 R136	RES. MF, 1/8W, 1%, 82.5	RN55D-82R5F	TRW	4701-03-8259	3
R152	RES. MF, 1/8W, 1%, 8.87K	RN55D-8871F	TRW	4701-03-8871	1
R72 R77	RES. MF, 1/8W, 1%, 909	RN55D-9090F	TRW	4701-03-9090	2
R20	RES. MF, 1/8W, 1%, 90.9K	RN55D-9092F	TRW	4701-03-9092	1
R009 R129	RES. MF, 1/4W, 1%, 1M	RN60D-1004F	TRW	4701-13-1004	2
R116 R117	RES. MF, 1/4W, 1%, 332	RN60D-3320F	TRW	4701-13-3320	2
R154	RES. MF, 1/4W, 1%, 40.2	RN60D-40R2F	TRW	4701-13-4029	1
R051 R165 R166 R167 R168	RES. MF, 1/4W, 1%, 49.9	RN60D-49R9F	TRW	4701-13-4999	5
R183	RES. MF, 1/4W, 1%, 619K	RN60D-6193F	TRW	4701-13-6193	1
R159	RES. MF, 1W, 1%, 681	RN70D-6810F	TRW	4701-33-6810	1
R109 R110	RES. SET, 2-2.49K, 1/8W QTY: 2: 4701-03-2491	130-501-1	WVTK	4789-00-0010	1
R118 R119	RES. SET, 2-4.02K, 1/8W	130-501-2	WVTK	4789-00-0014	1
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 7	REV N

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/P
Q14 Q15	TRANS	MPS-L08	FAIR	4902-00-0080	2
Q17	TRANS	TIP-29	TI	4902-00-0290	1
Q24	TRANS	TIP-30	TI	4902-00-0300	1
Q34	TRANS	TD-101	SPRAQ	4902-00-1010	1
Q13 Q16	TRANS	MPS-2369	FAIR	4902-02-3690	2
Q37 Q38	TRANS, M/PR, 2N2905A QTY: 2: 4901-02-9051	130-501-8	WVTK	4998-00-0011	1
Q30 Q31	TRANS, M/PR, 2N3638A QTY: 2: 4901-03-6381	130-501-9	WVTK	4998-00-0012	1
Q10 Q11	TRANS, M/PR, 2N3640 QTY: 2: 4901-03-6400	130-501-10	WVTK	4998-00-0013	1
Q07 Q08 Q26 Q27	TRANS, M/PR, 2N3645 QTY: 2: 4901-03-6460	130-501-11	WVTK	4998-00-0014	2
SW3	SWITCH ASSY ROTARY	132-SW1	WVTK	5104-00-0013	1
SW1A	WAFER	T-106	CTS	5104-02-0002	1
SW1B	WAFER	133-SW1-1	WVTK	5104-02-0008	1
NONE	SWITCH STOP	212-33-006	CTS	5104-07-0002	1
SW1C SW1D	WAFER FROM 5104-02-0007	5104-98-0001	WVTK	5104-98-0001	2
SW1	DETENT MOD	5104-99-0045	WVTK	5104-99-0045	1
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 9	REV N

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/P
R014 R018 R019 R021 R027 R181	QTY: 2: 4701-03-4021 RES. SET, 6-6.19K, 1/8W QTY: 6: 4701-03-6191	130-501-3	WVTK	4789-00-0015	1
R103 R106 R108 R111	RES. SET, 4-10K, 1/8W QTY: 4: 4701-03-1002	130-501-4	WVTK	4789-00-0017	1
CR19 CR20	DIODE, ZENER 6.2V	1N823A	NPC	4801-01-0823	2
CR21	DIODE	1N4581	MICRO	4801-01-4581	1
CR11 CR12 CR13 CR14	DIODE	SCE-1	SEMT	4801-02-0001	4
CR01 CR02 CR03 CR04 CR05 CR06 CR07 CR08 CR09 CR10 CR15 CR16 CR17 CR18 CR22	DIODE	FD-6666	FAIR	4807-02-6666	15
Q39	TRANS	2N2219A	NSC	4901-02-2191	1
Q33 Q40	TRANS	2N2905A	NSC	4901-02-9051	2
Q28	TRANS	2N3299	NSC	4901-03-2990	1
Q22 Q23 Q32	TRANS	2N3638A	CASER	4901-03-6381	3
Q6	TRANS	2N3640	FAIR	4901-03-6400	1
Q18 Q19 Q29 Q35 Q36 Q7	TRANS	2N3646	NSC	4901-03-6460	6
Q1	TRANS	2N3903	NSC	4901-03-9030	1
Q2	TRANS	2N3905	ITT	4901-03-9050	1
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 8	REV N

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/P
IC4	FROM 5104-01-0010 IC	AD 811	ANDEV	7000-08-1109	1
IC5	IC, CLASS I, CA-3030 QTY: 1: 7000-30-3000	130-501-15	WVTK	7200-00-0001	1
IC8	IC, CLASS II, CA-3030 QTY: 1: 7000-30-3000	130-501-16	WVTK	7200-00-0002	1
IC2	IC, CLASS I, CA-3039 QTY: 1: 7000-30-3900	130-501-18	WVTK	7200-00-0004	1
IC1 IC3	IC, CLASS I, MA-709 QTY: 1: 7000-07-0900	130-501-13	WVTK	7200-00-0005	2
IC6 IC7	IC, CLASS II, MA-709 QTY: 1: 7000-07-0900	130-501-14	WVTK	7200-00-0006	2
WAVETEK PARTS LIST		TITLE MAIN		ASSEMBLY NO. 1100-00-0039 PAGE: 10	REV N

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	WAVETEK SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ ENGR		TITLE PARTS LIST MAIN	
	RELEASE APPROV			
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES .1° XX ± .030			
	DO NOT SCALE DWG	MODEL NO.	DWG NO.	REV
	SCALE	132	1100-00-0039	N
		CODE IDENT	23338	SHEET 2 OF 2



APPROVED

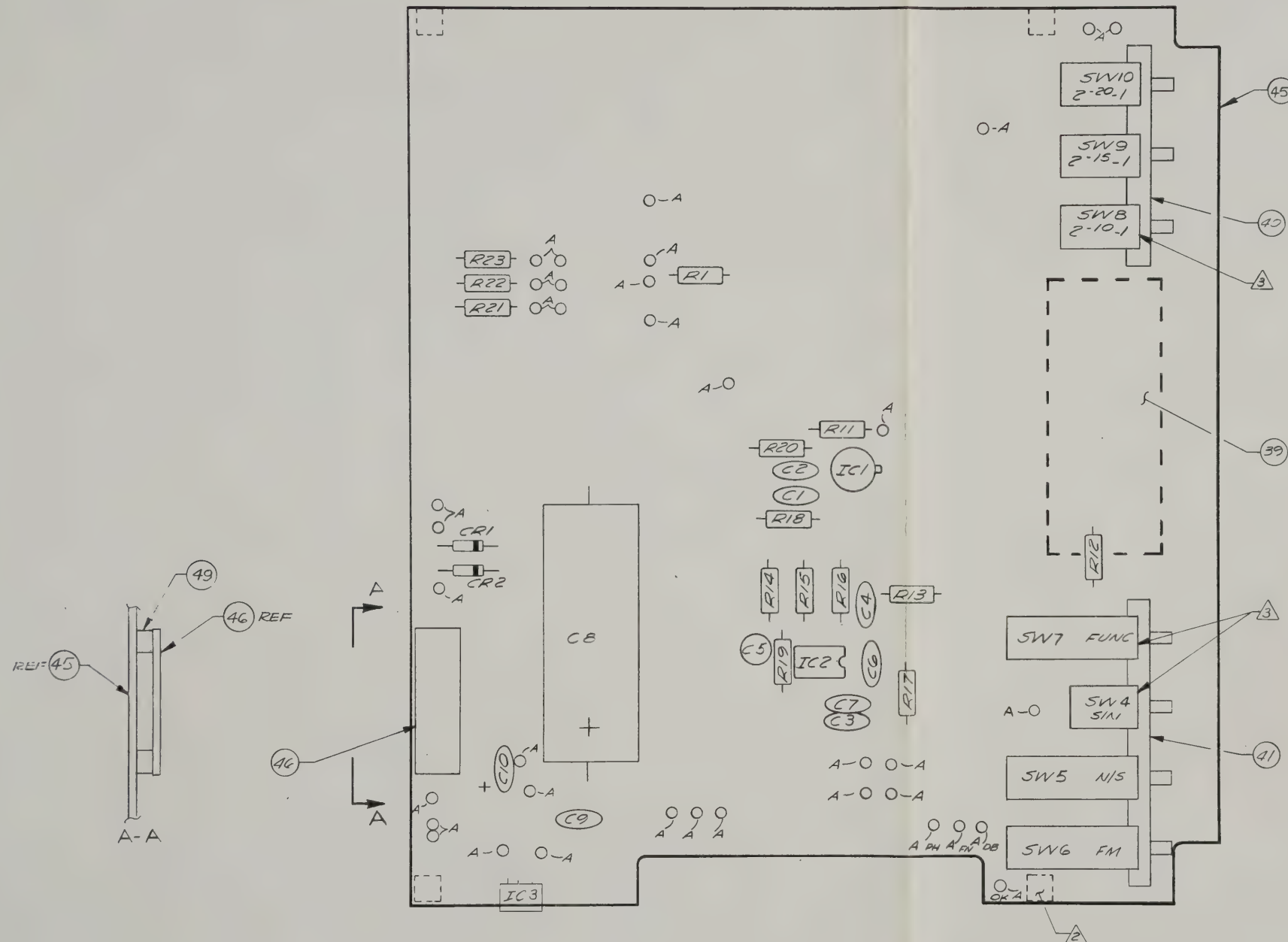
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E	ECN 1229	PO	3-20-5
D	ECN 771	BA	6-2-77 R.C.
C	ECN 441	SLD	4-2-77 R.C.
B	ECN# 422	BZ	4-2-77 R.C.

TOLERANCE UNLESS OTHERWISE SPEC		REV	ECN	BY	DATE	APP
.XXX ± .010 .XX ± .030 ANGLES ± 0°30'		WAVETEK			SAN DIEGO, CALIFORNIA	
SCALE	N/A	BY	GRAY	DATE	2-14-72	APP R. C.
MATERIAL	N/A	TITLE ASSY, AMP BOARD				
FINISH	N/A	MODEL NO.	132	DWG NO.	547.1 OF 2 0101-00-0040	REV F
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SEE SHEET 1.

		SEE SHEET 1	
FORM FULL	B. REDMAN	2-15-72	R. C.
CATEGORY	SWITCH BRACKET, SUB- ASSY AMP BOARD		
N/A	132	SHT 2 of 2 0101-00-0040	F
N/A			

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



3 CUT P.C. PINS OFF NEAR COMPONENT BODY (TOP SIDE) ON SWITCHES SW4, SW7 & SW8

2. USE CD BLOCK, SWAGE IN BOARD (FAR SIDE)

1. A = INSERT AMP PINS (NEAR SIDE)

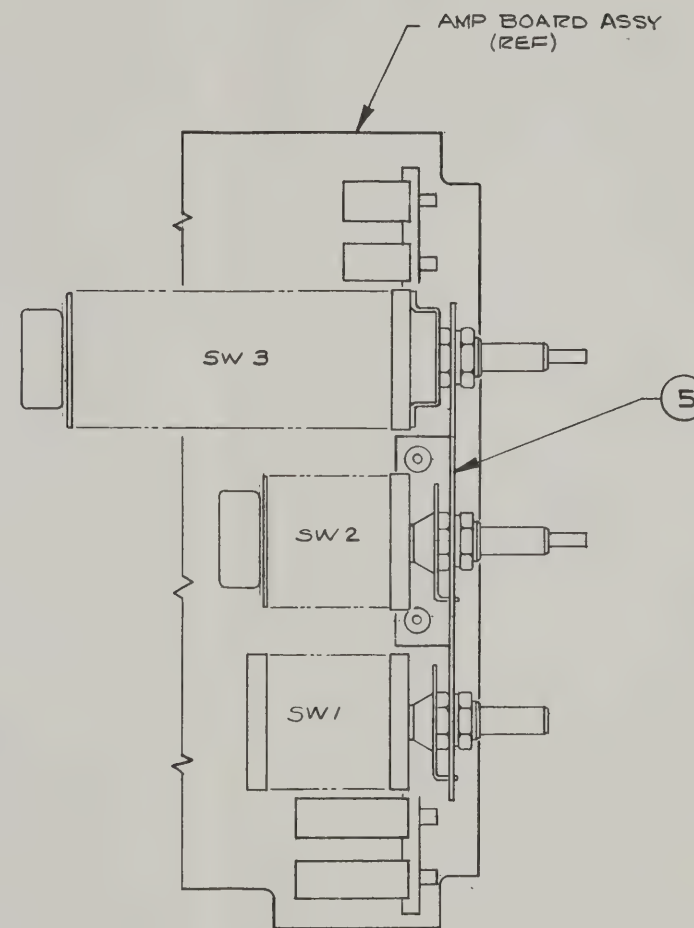
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C	ECN 1550	ED	6-2-74
E	ECN 1289	ED	3-28-75
D	ECN 771	BA	4-28-75
C	ECN 441	BA	4-28-75
B	ECN 412	BA	4-28-75

REV	ECN	BY	DATE	APP
1		GRAY	2-14-72	R. C.
WAVETEK SAN DIEGO, CALIFORNIA				
SCALE	N/A	TITLE	ASSY, AMP BOARD	
MATERIAL	N/A	MODEL NO.	5071 of 2	REV
FINISH	N/A	132	0101-00-0040	F

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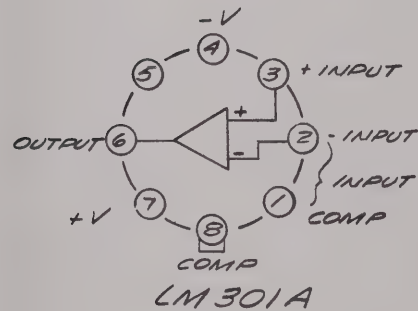
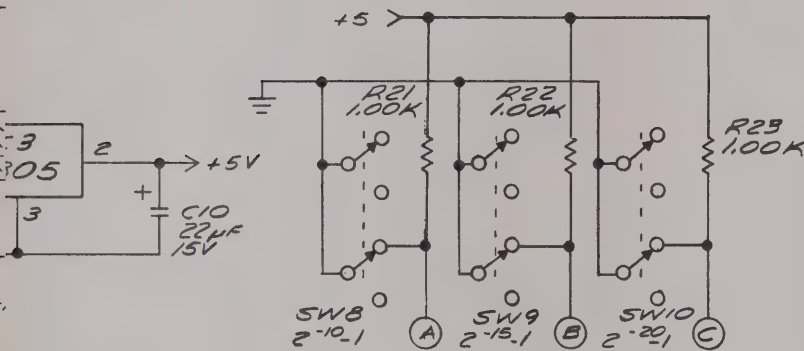
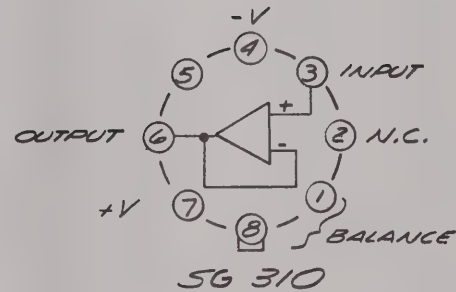
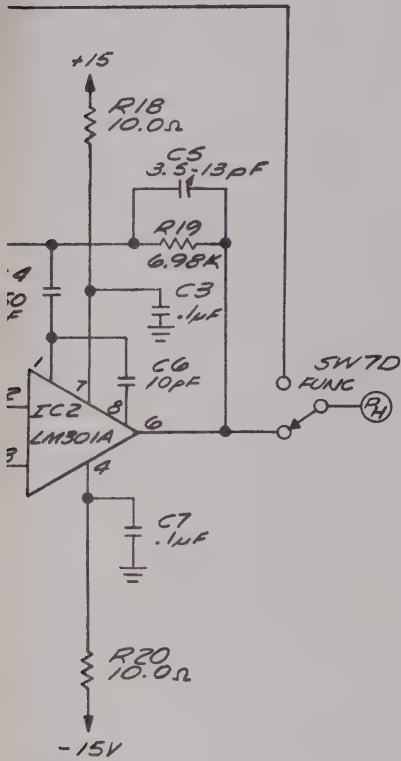




SWITCH INSTALLATION  
(SW1, SW2, SW3)

SEE SHEET 1				
FULL	B. REDMAN	2-15-72	R. C.	
N/A	SWITCH BRACKET, SUB- ASSY AMP BOARD SWT 2 OF 2			
	132	0101-00-0040	F	
N/A				

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



LAST REF DESIG

C10 R23  
C22 T1  
IC3 SW10

C	ECN 1638	R0	11-77
B	# 771	BA	102673 R.C.
A	# 425	B.R.	4-2572 R.C.

TOLERANCE UNLESS OTHERWISE SPEC  .XXK ± .010 .XX ± .030 ANGLES ± 0°30'	REV	ECN	BY	DATE	APP
	WAVETEK			SAN DIEGO, CALIFORNIA	
SCALE —	BY GRAY	DATE 12-15-71	APP R.C.		
MATERIAL  —	TITLE SCHEMATIC,  AMP BOARD				
FINISH  —	MODEL NO.	DWG NO.	REV		
	132	0103-00-0040	C		
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REV ECN BY DATE APP

	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
	0101-00-0040	WVTK	0101-00-0040	1
	0103-00-0040	WVTK	0103-00-0040	1
	132-001	WVTK	1202-00-0003	1
	152-002	WVTK	1202-00-0004	1
	142-003	WVTK	1202-00-0008	1
	8480	WVTK	1400-00-0653	2
	132-309	WVTK	1400-00-1653	1
	DU-100	CKL	1500-01-0011	1
	UK20-104	AKCO	1500-01-0413	5
	DD-151	CRL	1500-01-5111	1
15V	39D1986015GL4	SPHAG	1500-51-9201	1
50V	78-TM1K0-02 3.5/13PF	TM1K0	1500-51-3000	1
5V	196D226X9015KA1	SPHAG	1500-72-2601	1
	132-112	WVTK	1700-00-0040	1
	135-113	WVTK	1700-00-0188	1
	61182-2	AMP	2100-05-0020	37
	74-11-106-13	SUTCO	2800-09-0017	2
	1591-811	USECO	2800-09-0021	4
ASSEMBLY NO. 1100-00-0040				REV F
PAGE: 1				

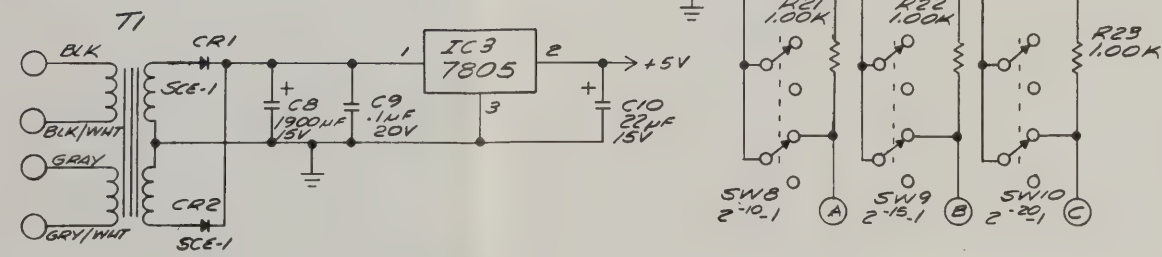
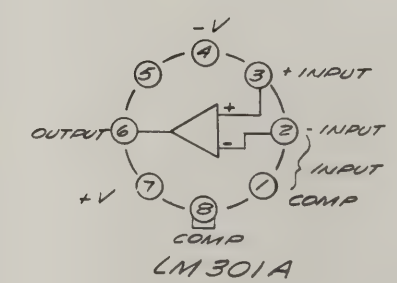
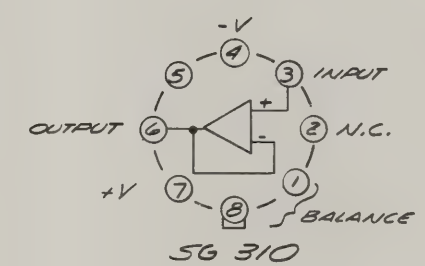
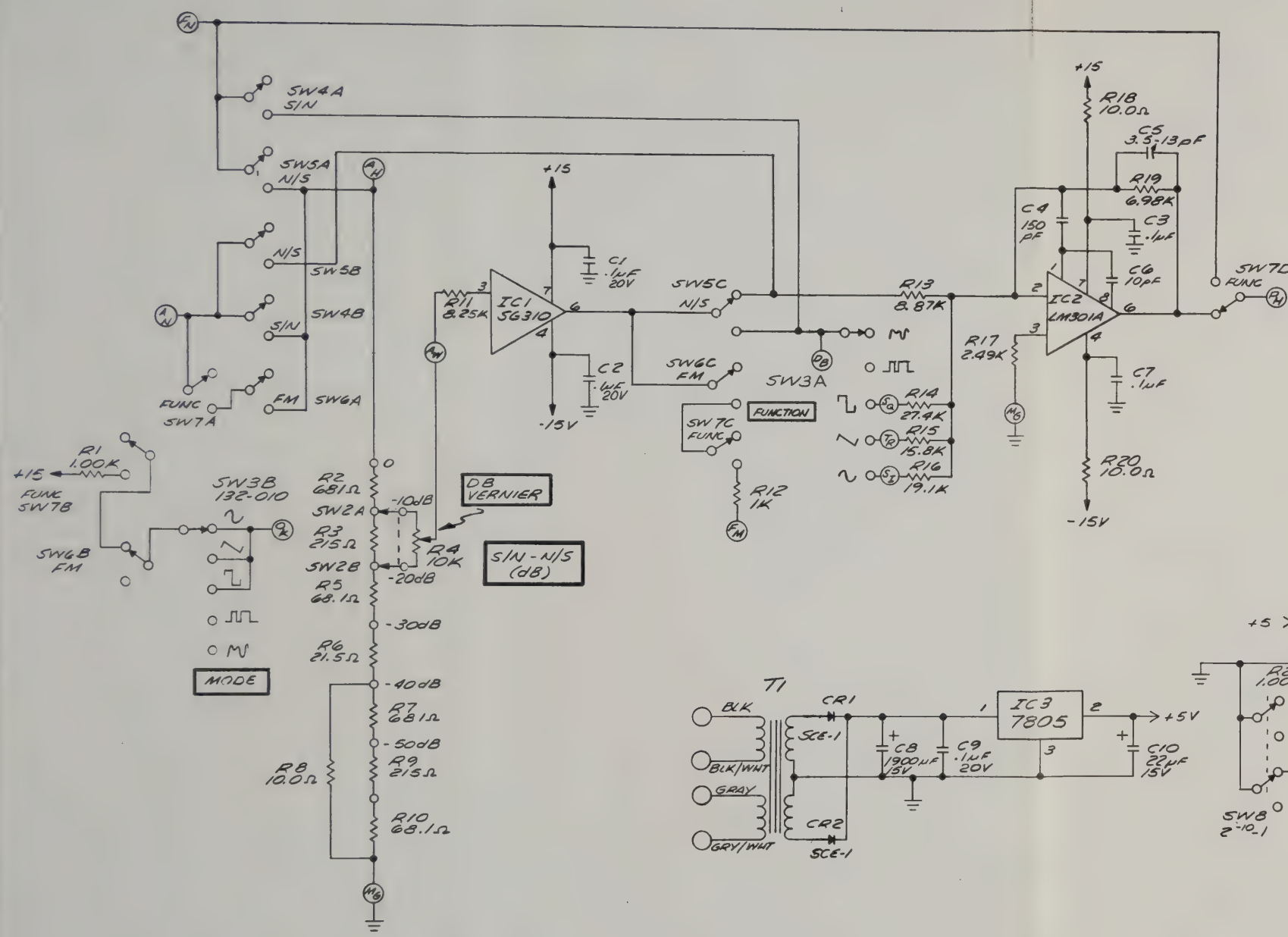
	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY/PT
1K	KN550-1001F	TRN	4701-03-1001	5
10	KN550-10K0F	TRN	4701-03-1009	2
15.8K	KN550-1582F	TRN	4701-03-1582	1
19.1K	KN550-1912F	TRN	4701-03-1912	1
2.49K	KN550-2491F	TRN	4701-03-2491	1
27.4K	KN550-2742F	TRN	4701-03-2742	1
5.98K	KN550-6981F	TRN	4701-03-6981	1
8.25K	KN550-8251F	TRN	4701-03-8251	1
8.87K	KN550-8871F	TRN	4701-03-8871	1
	SCE-1	SEB-TC	4801-02-0001	2
	132-400	WVTK	5103-00-0004	1
	132-401	WVTK	5103-00-0005	1
	J-52305-HLACK	CRL	5103-04-0003	7
	LM 301AN	nSC	7000-03-0100	1
	7000-03-1000	WVTK	7000-03-1000	1
UR	7805343	FAIR	8000-78-0500	1
ASSEMBLY NO. 1100-00-0040				REV F
PAGE: 2				

NOTE: UNLESS OTHERWISE SPECIFIED

MOVE ALL BURRS TO BREAK SHARP EDGES	DRAWN	DATE	 SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ ENGR			
	RELEASE APPROV		TITLE  <h1>AMPLIFIER</h1>	
	TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX : .010 ANGLES : 1° XX : .030			
ISH WVETEK PROCESS	DO NOT SCALE DWG	MODEL NO.	DWG NO.	REV
	SCALE	132	1100-00-0040	F
		CODE IDENT	23338	SHEET OF



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



5 ALL PUSHBUTTON SWITCHES SHOWN IN "OUT" POSITION  
 4. ALL RESISTORS ARE METAL FILM, 1/8W, 1%  
 3. ATTENUATOR RESISTORS MOUNTED ON SWITCH  
 2. FM PUSH ON, PUSH OFF  
 1. FUN, SIN, N/S INTERLOCKING PUSHBUTTON SWITCHES  
 NOTES: UNLESS OTHERWISE SPECIFIED

LAST REF DESIG  
 C10 R23  
 CR2 T1  
 IC3 SW10

TOLERANCE UNLESS OTHERWISE SPEC		XXX	± .010
		.XX	± .030
		ANGLES	± 0°30'
SCALE	—	BY	DATE
MATERIAL	—	DATE	DATE
FINISH	—	DATE	DATE

C	ECN 1638	P0	11-77
B	*771	BA	10262 R.C.
A	*425	B.R.	4-7571 R.C.

WAVETEK		SAN DIEGO, CALIFORNIA
BY	DATE	APP
GRAY	12-15-71	RC
TITLE SCHEMATIC, AMP BOARD		
MODEL NO.	DWG NO.	REV
132	0103-00-0040	C

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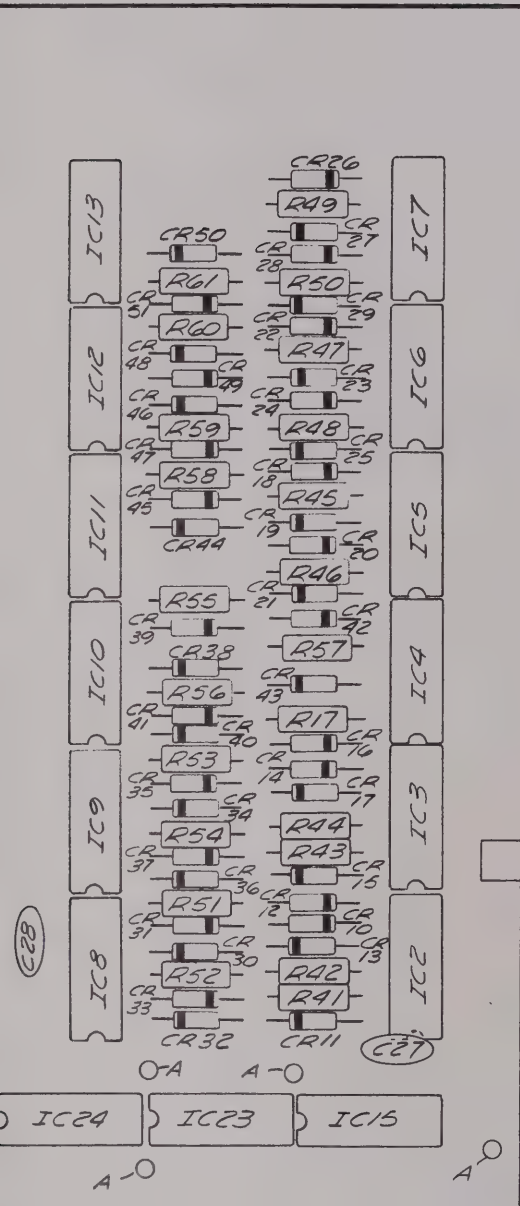
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFG-PART-NO	MFG	WAVETEK NO.	QTY/PT
NONE	ASSY DMMG, AMP	0101-00-0040	AVTK	0101-00-0040	1
NONE	SCHEMATIC, AMP	0103-00-0040	AVTK	0103-00-0040	1
SW2	ATTEN SW ASSY	132-001	AVTK	1202-00-0003	1
SW3	FREQ SW ASSY	132-002	AVTK	1202-00-0004	1
SW1	ATTEN SW ASSY	142-003	AVTK	1202-00-0008	1
49	SPACER	8480	AVTK	1400-00-0653	2
39	BMKT	132-309	AVTK	1400-00-1653	1
C6	CAP, CER, 10PF, 1KV	DU-100	CML	1500-01-0011	1
C1 C2 C3 C7 C9	CAP, CER, .1MF, 20V	UK20-104	AMCO	1500-01-0413	5
C4	CAP, CER, 150PF, 1KV	DD-151	CML	1500-01-5111	1
C8	CAP, ELECT, 1900MF, 15V	39D198G015GL4	SPHAG	1500-31-9201	1
C5	VAR1, 3.5-13PF, 250V	7S-TWIKO-02 3.5/13PF	TWIKO	1500-51-3000	1
C10	CAP, TANT, 22MF, 15V	1960226X4015KA1	SPHAG	1500-72-2601	1
45	AMP	132-112	AVTK	1700-00-0040	1
46	TERMINAL	135-113	AVTK	1700-00-0188	1
50	PIN, MALE	61182-2	AMP	2100-05-0020	37
51	INSERT # 6	74-11-106-13	SUTCO	2800-09-0017	2
38	FAST, CHASSIS	1591-B11	USECO	2800-09-0021	4
WAVETEK PARTS LIST		TITLE AMPLIFIER	ASSEMBLY NO. 1100-00-0040 PAGE: 1		REV F

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFG-PART-NO	MFG	WAVETEK NO.	QTY/PT
RU1 R12 R21 R22 R23	RES, MF, 1/8W, 1%, 1K	KN550-1001F	TKA	4701-03-1001	5
R18 R20	RES, MF, 1/8W, 1%, 10	KN550-10K0F	TKA	4701-03-1009	2
R15	RES, MF, 1/8W, 1%, 15.8K	KN550-1582F	TKA	4701-03-1582	1
R16	RES, MF, 1/8W, 1%, 19.1K	KN550-1912F	TKA	4701-03-1912	1
R17	RES, MF, 1/8W, 1%, 2.49K	KN550-2491F	TKA	4701-03-2491	1
R14	RES, MF, 1/8W, 1%, 27.4K	KN550-2742F	TKA	4701-03-2742	1
R19	RES, MF, 1/8W, 1%, 6.48K	KN550-6981F	TKA	4701-03-6981	1
R11	RES, MF, 1/8W, 1%, 6.25K	KN550-6251F	TKA	4701-03-6251	1
R13	RES, MF, 1/8W, 1%, 8.87K	KN550-8871F	TKA	4701-03-8871	1
CH1 CH2	DIODE	SCE-1	STC	4801-02-0001	2
41	SWITCH ASSY Pd	132-400	AVTK	5103-00-0004	1
40	SWITCH ASSY Pd	132-401	AVTK	5103-00-0005	1
S2	BUTTON	J-52305-HLACK	CWL	5103-04-0003	7
IC2	IC	LM 301AN	NSC	7000-03-0100	1
IC1	IC	7000-03-1000	AVTK	7000-03-1000	1
IC3	VOLTAGE REGULATOR	7805343	FAIR	8000-78-0500	1
WAVETEK PARTS LIST		TITLE AMPLIFIER	ASSEMBLY NO. 1100-00-0040 PAGE: 2		REV F

NOTE: UNLESS OTHERWISE SPECIFIED

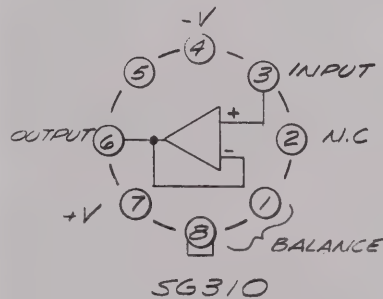
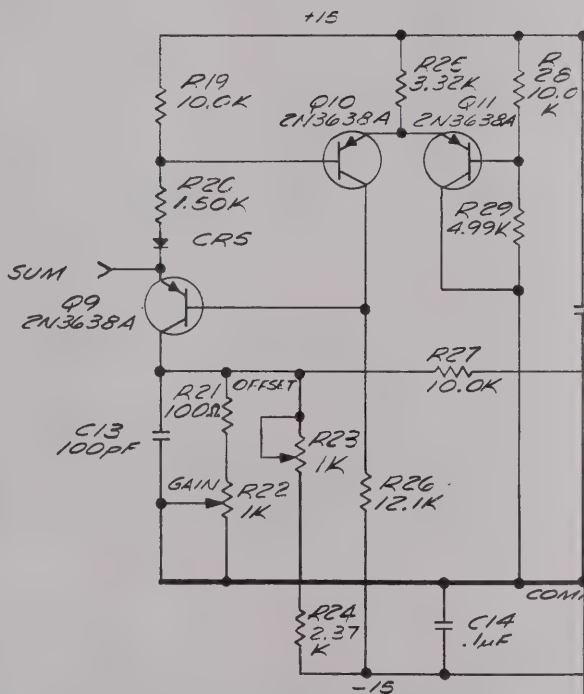
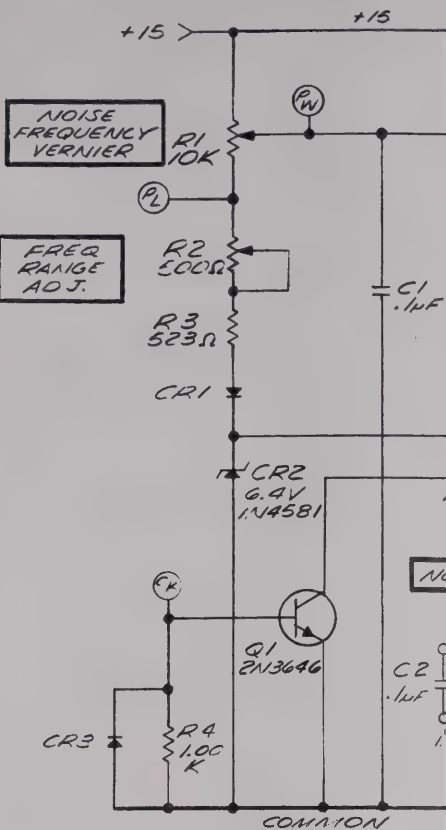
REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	WAVETEK SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ ENGR		TITLE	
	RELEASE	APPROV	AMPLIFIER	
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± .1° XX ± .030		MODEL NO.	REV
	DO NOT SCALE DWG		132	1100-00-0040 F
	SCALE		CODE IDENT	SHEET OF
			23338	

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



TOLERANCE UNLESS OTHERWISE SPEC		BY <i>GRAY</i> DATE <i>2.0.72</i> APP <i>R.S.</i>	
.XXX ± .010		TITLE	
.XX ± .030		ASSY	
ANGLES ± 0°30'		LOGIC BOARD	
SCALE <i>N/A</i>	MODEL NO. <i>132</i>	DWG NO. <i>2101-00-0041</i>	REV <i>C</i>
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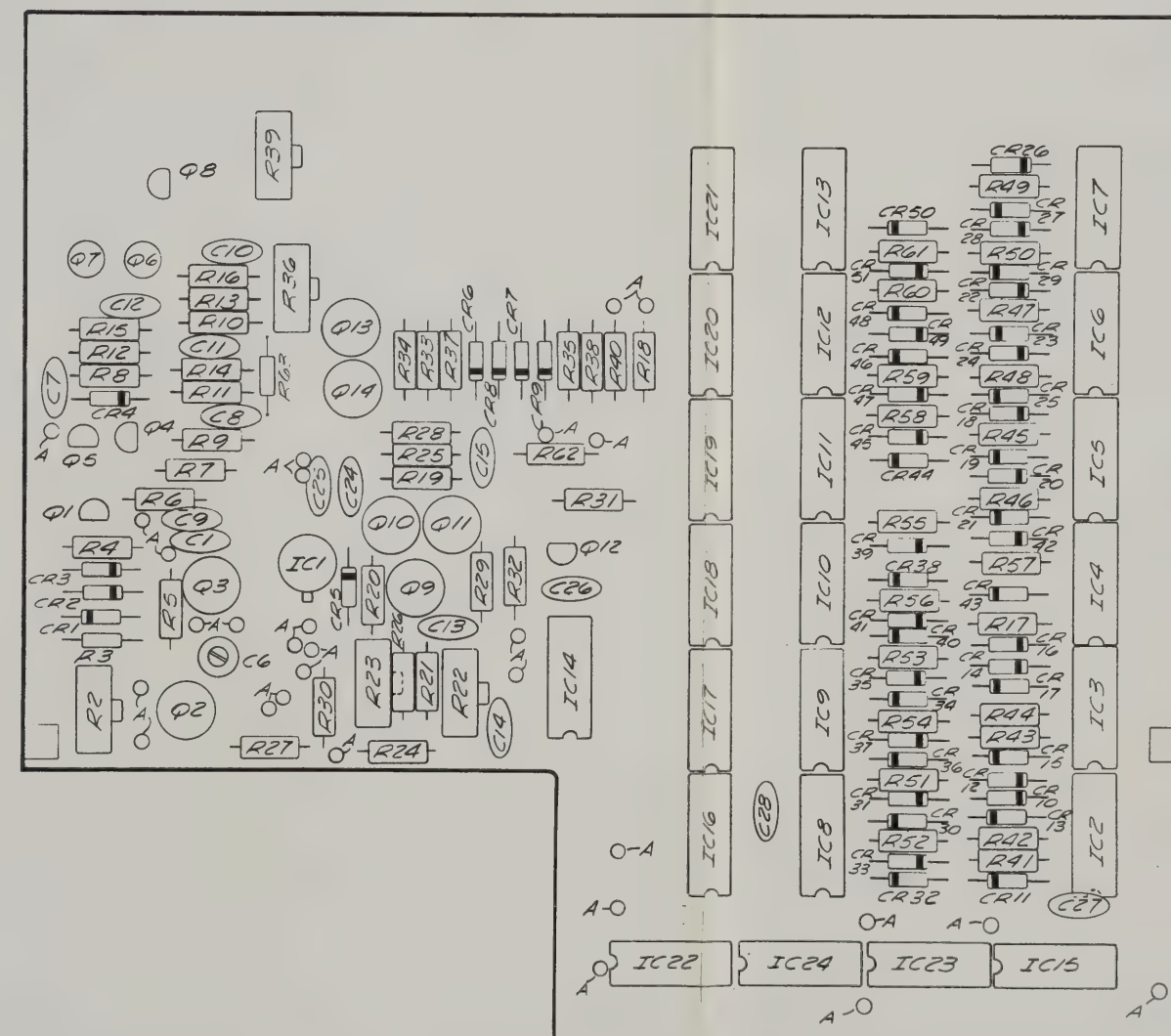


2. ALL RESISTORS ARE METAL FILM, 1/8W, 1%  
 1. ALL DIODES ARE FD6666  
 NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
REV	DESCRIPTION	DATE	APPROVED	

C		ECN 1638	ED 11-27-71	
B		ECN 1548	ED 6-3-71	
A		#425	B.R. 4-29-71	P.C.
REV	ECN	BY	DATE	APP
SCALE	—	BY GRAY	DATE 12-17-71	APP R.C.
MATERIAL	—	TITLE SCHEMATIC, LOGIC BOARD		
FINISH	—	MODEL NO. 132	DWG NO. 0103-00-0041	REV C
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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



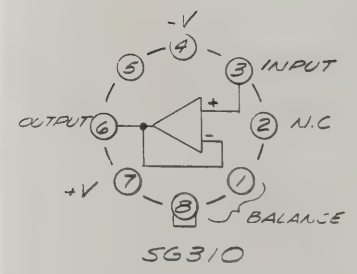
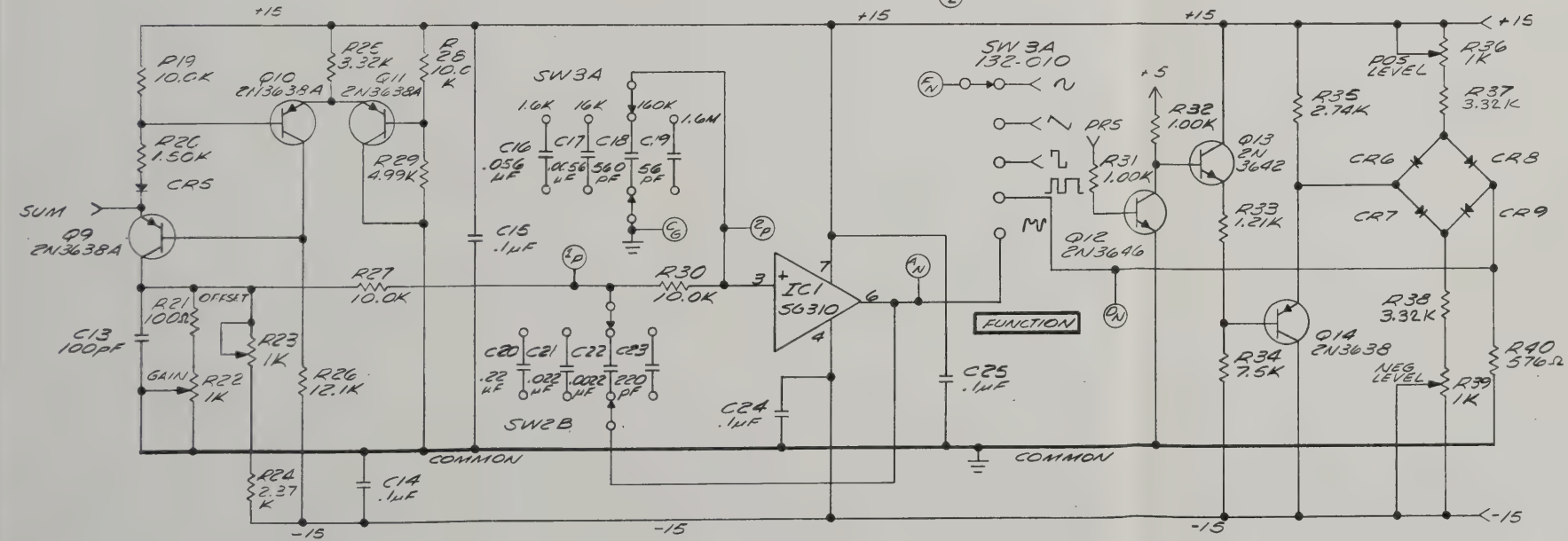
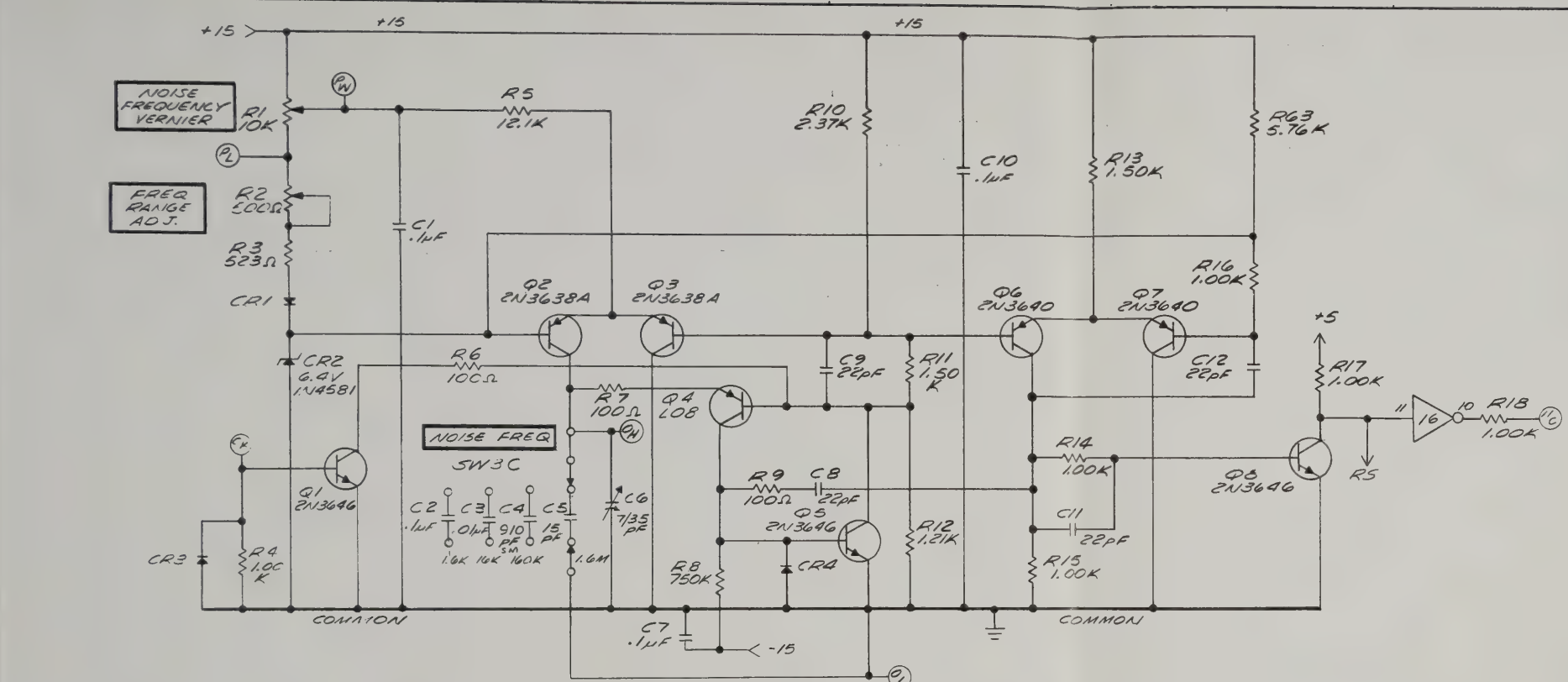
2. USE CO BLOCK, SWAGE IN BOARD (NEAR SIDE)

1. A - INSERT AMP PINS (NEAR SIDE)

NOTES:

TOLERANCE UNLESS OTHERWISE SPEC	XXX ± .010	XX ± .030	ANGLES ± 0°30'
SCALE	N/A	BY GRAY	DATE 2-0-78
MATERIAL	N/A	TITLE	ASSY LOGIC BOARD
FINISH	N/A	MODEL NO	132
		DWG NO	7101-00-0041
		REV	C
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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



LAST REF DESIG  
 R63 IC24  
 C28 Q14  
 CR51 SW2

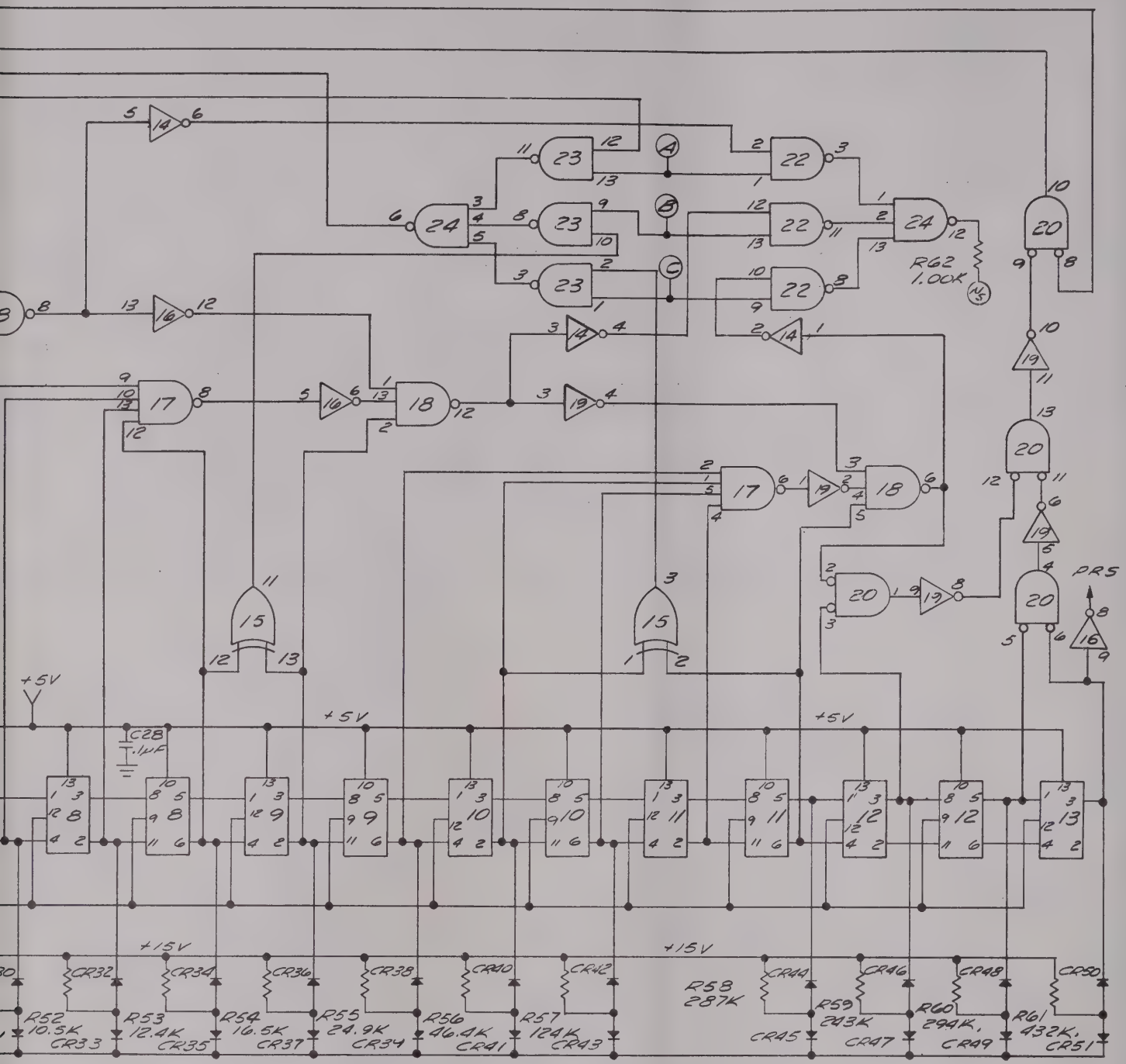


2. ALL RESISTORS ARE METAL FILM, 1/8W, 1%  
 1. ALL DIODES ARE FD6666  
 NOTES: UNLESS OTHERWISE SPECIFIED

TOLERANCE UNLESS OTHERWISE SPEC			
.XXX	± .010		
.XX	± .005		
ANGLES	± 0°30'		
SCALE	1" = 1"		
MATERIAL	BY GRAY	DATE 12-17-71	APP R.G.
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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



SEE SHEET 1

A	# 425	B.R. 4-25-72	P.C.
REV	ECN	BY	DATE
TOLERANCE UNLESS OTHERWISE SPEC		WAVETEK	
.XXX ± .010		SAN DIEGO, CALIFORNIA	
.XX ± .030		BY GRAY	
ANGLES ± 0°30'		DATE 12-21-71	
SCALE -		APP R. G.	
MATERIAL -		TITLE	
		SCHEMATIC, LOGIC BOARD	
FINISH -		MODEL NO. 132	
		DWG NO. 0103-00-0041	
		REV C	

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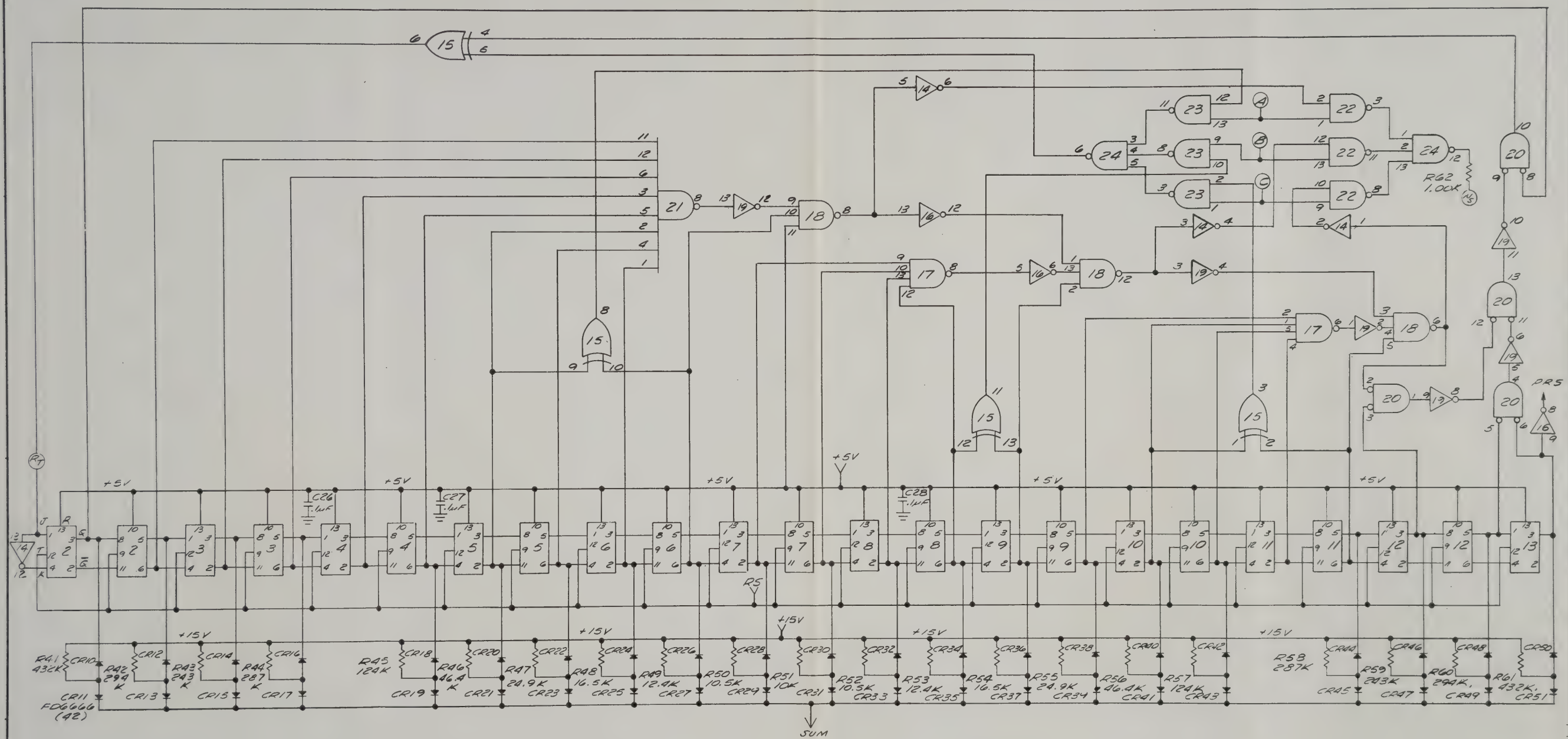
REV	ECN	BY	DATE	APP
-----	-----	----	------	-----

REFERENCE DESI	WAVETEK NO.	QTY/PT
NONE	4701-03-2943	2
NONE	4701-03-3321	3
NONE	4701-03-4642	2
12	4701-03-4991	1
NONE	4701-03-5230	1
26	4701-03-5760	1
C13	4701-03-5761	1
C01 C07 C10 C11 C24 C25 C26 C27	4701-03-7501	1
C08 C09 C11 C12	4701-13-4323	2
C6	4701-13-7503	1
73	4801-01-4581	1
J5 J6	4807-02-6666	50
75		
71		
76		
77		
78		
79		
WAVETEK PARTS LIST		REV C

REFERENCE DESI	WAVETEK NO.	QTY/PT
M22 M23 M30 M	4401-03-6381	6
M2	4401-03-6400	2
M06 M07 M09 M	4401-03-6420	1
M04 M14 M15 M	4401-03-6460	4
M16 M31 M32 M	4402-00-0080	1
M14 M27 M28 M	7000-03-1000	1
M50 M52	8000-74-0000	2
M12 M33	8000-74-0200	1
M05 M20	8000-74-0400	3
M49 M53	8000-74-1000	2
M45 M51	8000-74-2000	1
M11 M13 M20	8000-74-3000	1
M48 M54	8000-74-8600	1
M10 M24	8007-41-0700	12
M43 M59		
M47 M55		
M35		
M44 M58		
WAVETEK PARTS LIST		REV C

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES		DRAWN	DATE	<b>WAVETEK</b> SAN DIEGO • CALIFORNIA TITLE LOGIC	
MATERIAL		PROJ ENGR			
		RELEASE APPROV			
		TOLERANCE UNLESS OTHERWISE SPECIFIED XXX : 010 ANGLES : 1" XX : 030			
FINISH WAVETEK PROCESS		DO NOT SCALE DWG			
		SCALE		MODEL NO. 132	DWG NO. 1100-00-0041
		CODE IDENT	23338	REV C	SHEET OF



- IC 2-13 SN 74107
- IC 14, 16, 19 SN 7404
- IC 22, 23 SN 7400
- IC 21 SN 7430
- IC 20 SN 7402
- IC 15 SN 7486
- IC 17 SN 7420
- IC 18, 24 SN 7410
- +5 TO PIN 14 ALL IC'S
- GND TO PIN 7 ALL IC'S

NOTES: UNLESS OTHERWISE SPECIFIED

TOLERANCE UNLESS OTHERWISE SPEC.			
XX	± 0.10		
XX	± 0.20		
XX	± 0.30		
SCALE -			
MATERIAL -			
FINISH -			

SEE SHEET 1			
REV	ECN	BY	DATE
A	#425	B. R.	4-25-72

WAVETEK		SAN DIEGO, CALIFORNIA	
BY GRAY	DATE 7-21-71	APP R. G.	
TITLE SCHEMATIC, LOGIC BOARD			
MODEL NO. 132	DWG NO. 0103-00-0041	REV C	

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REFERENCE DESIGNATIONS	PART DESCRIPTION	ORIG-MFGN-PART-NO	MFGN	WAVETEK NO.	QTY/PT
NONE	ASSY DRWG, LOGIC	0101-00-0041	WVTK	0101-00-0041	1
NONE	SCHEMATIC, LOGIC	0103-00-0041	WVTK	0103-00-0041	1
T2	TRANSFORMER	132-500	WVTK	1204-00-0482	1
NONE	HNKT	130-306	WVTK	1400-00-1093	1
26	HNKT	132-302	WVTK	1400-00-1633	1
C13	CAP, CER, 100PF, 1KV	00-101	CRL	1500-01-0111	1
C01 C07 C10 C14 C15 C24 C25 C26 C27 C28	CAP, CER, .1MF, 20V	UK20-104	AKCO	1500-01-0413	10
C08 C09 C11 C12	CAP, CER, 22PF, 1KV	00-220	CRL	1500-02-2011	4
C6	VAR1, 7-35PF, 250V	78-TRIKO-02 7/35 PF	TRIKO	1500-53-5000	1
73	LOGIC	132-113	WVTK	1700-00-0041	1
J5 J6	BNC LUNN	KC-7946	KING	2100-01-0002	2
75	SKT, IC, 14PIN	14-D1F	CINCH	2100-03-0011	23
71	SOLDER LUG	1497	SMITH	2100-04-0012	2
76	PIN, MALE	61182-C	AMP	2100-05-0020	27
77	INSEKT # 6	74-11-106-13	SOLICO	2600-09-0017	2
78	FAST, CHASSIS	15V1-M11	USECO	2600-09-0021	2
79	WASHER, SHOULDER	2668	SMITH	2800-27-0004	4
WAVETEK PARTS LIST		TITLE LOGIC		ASSEMBLY NO. 1100-00-0041 PAGE: 1	
				REV C	

REFERENCE DESIGNATIONS	PART DESCRIPTION	ORIG-MFGN-PART-NO	MFGN	WAVETEK NO.	QTY/PT
R42 R60	RES, MF, 1/8W, 1%, 294K	KN550-2943F	TKN	4701-03-2943	2
R25 R37 R38	RES, MF, 1/8W, 1%, 3.32K	KN550-3321F	TKN	4701-03-3321	3
R46 R56	RES, MF, 1/8W, 1%, 46.4K	KN550-4642F	TKN	4701-03-4642	2
R29	RES, MF, 1/8W, 1%, 4.99K	KN550-4991F	TKN	4701-03-4991	1
R3	RES, MF, 1/8W, 1%, 523	KN550-5230F	TKN	4701-03-5230	1
R40	RES, MF, 1/8W, 1%, 576	KN550-5760F	TKN	4701-03-5760	1
R63	RES, MF, 1/8W, 1%, 5.76K	KN550-5761F	TKN	4701-03-5761	1
R34	RES, MF, 1/8W, 1%, 7.5K	KN550-7501F	TKN	4701-03-7501	1
R41 R61	RES, MF, 1/4W, 1%, 432K	KN600-4323F	TKN	4701-13-4323	2
R8	RES, MF, 1/4W, 1%, 750K	KN600-7503F	TKN	4701-13-7503	1
CR2	DIODE	1N4581	MICRO	4801-01-4581	1
CR03 CR04 CR05 CR06 CR07 CR08 CR09 CR1 CR10 CR11 CR12 CR13 CR14 CR15 CR16 CR17 CR18 CR19 CR20 CR21 CR22 CR23 CR24 CR25 CR26 CR27 CR28 CR29 CR30 CR31 CR32 CR33 CR34 CR35 CR36 CR37 CR38 CR39 CR40 CR41 CR42 CR43 CR44 CR45 CR46 CR47 CR48 CR49 CR50 CR51	DIODE	FD-6666	FAIR	4807-02-6666	50
WAVETEK PARTS LIST		TITLE LOGIC		ASSEMBLY NO. 1100-00-0041 PAGE: 3	
				REV C	

REFERENCE DESIGNATIONS	PART DESCRIPTION	ORIG-MFGN-PART-NO	MFGN	WAVETEK NO.	QTY/PT
R22 R23 R36 R39	POT, THIN, 1K	91AR1K	BECK	4600-01-0209	4
R2	POT, THIN, 500	91AR500	BECK	4600-05-0104	1
R06 R07 R09 R21	RES, MF, 1/8W, 1%, 100	KN550-1000F	TKN	4701-03-1000	4
R04 R14 R15 R16 R17 R18 R31 R32 R62	RES, MF, 1/8W, 1%, 1K	KN550-1001F	TKN	4701-03-1001	9
R14 R27 R28 R30 R51	RES, MF, 1/8W, 1%, 10K	KN550-1002F	TKN	4701-03-1002	5
R50 R52	RES, MF, 1/8W, 1%, 10.5K	KN550-1052F	TKN	4701-03-1052	2
412 R33	RES, MF, 1/8W, 1%, 1.21K	KN550-1211F	TKN	4701-03-1211	2
R05 R26	RES, MF, 1/8W, 1%, 12.1K	KN550-1212F	TKN	4701-03-1212	2
R44 R53	RES, MF, 1/8W, 1%, 12.4K	KN550-1242F	TKN	4701-03-1242	2
R45 R57	RES, MF, 1/8W, 1%, 124K	KN550-1243F	TKN	4701-03-1243	2
R11 R13 R20	RES, MF, 1/8W, 1%, 1.5K	KN550-1501F	TKN	4701-03-1501	3
R48 R54	RES, MF, 1/8W, 1%, 16.5K	KN550-1652F	TKN	4701-03-1652	2
R10 R24	RES, MF, 1/8W, 1%, 2.37K	KN550-2371F	TKN	4701-03-2371	2
R43 R59	RES, MF, 1/8W, 1%, 243K	KN550-2433F	TKN	4701-03-2433	2
R47 R55	RES, MF, 1/8W, 1%, 24.9K	KN550-2492F	TKN	4701-03-2492	2
R35	RES, MF, 1/8W, 1%, 2.74K	KN550-2741F	TKN	4701-03-2741	1
R44 R58	RES, MF, 1/8W, 1%, 267K	KN550-2673F	TKN	4701-03-2673	2
WAVETEK PARTS LIST		TITLE LOGIC		ASSEMBLY NO. 1100-00-0041 PAGE: 2	
				REV C	

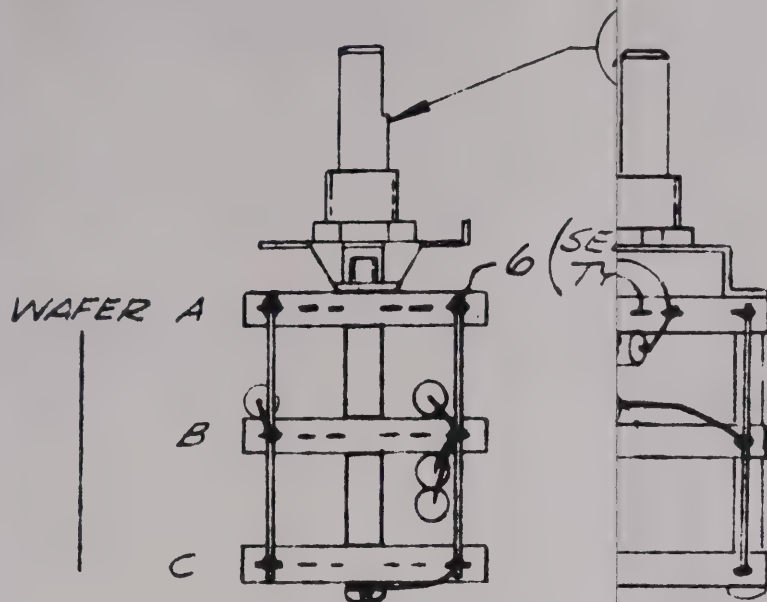
REFERENCE DESIGNATIONS	PART DESCRIPTION	ORIG-MFGN-PART-NO	MFGN	WAVETEK NO.	QTY/PT
Q10 Q11 Q14 Q2 Q3 Q4	TRANS	2N3638A	FAIR	4401-03-6381	6
Q6 Q7	TRANS	2N3640	FAIR	4401-03-6400	2
Q13	TRANS	2N3642	FAIR	4401-03-6420	1
Q1 Q12 Q5 Q8	TRANS	2N3646	FAIR	4401-03-6460	4
Q4	TRANS	MPS-LU8	FAIR	4402-00-0080	1
IC1	IC	7000-03-1000	WVTK	7000-03-1000	1
IC22 IC23	IC	7400	TI	8000-74-0000	2
IC20	IC	7402	TI	8000-74-0200	1
IC14 IC16 IC19	IC	7404	TI	8000-74-0400	3
IC18 IC24	IC	7410	TI	8000-74-1000	2
IC17	IC	7420	TI	8000-74-2000	1
IC21	IC	7430	TI	8000-74-3000	1
IC15	IC	7486	TI	8000-74-8600	1
IC02 IC03 IC04 IC05 IC06 IC07 IC08 IC09 IC10 IC11 IC12 IC13	IC	74107	TI	8007-41-0700	12
WAVETEK PARTS LIST		TITLE LOGIC		ASSEMBLY NO. 1100-00-0041 PAGE: 4	
				REV C	

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	WAVETEK SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ ENGR		TITLE LOGIC	
	RELEASE	APPROV		
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES .1° XX ± .030			
SCALE	DO NOT SCALE DWG	MODEL NO. 132	DWG NO. 1100-00-0041	REV C
		CODE IDENT 23338	SHEET	OF

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG=MFGN=PART=NU	MFGP	WAVETEK NU.	QTY/PT
R7	KES,MF,1/8W,1%,249	RN550-2440F	TKW	4701-03-2490	1
R3	KES,MF,1/8W,1%,27.4	KN550-27R4F	TKW	4701-03-2749	1
R4	KES,MF,1/8W,1%,54.9	KN550-54R9F	TKW	4701-03-5499	1
R13 R5	KES,MF,1/8W,1%,59	KN550-59R0F	TKW	4701-03-5909	2
R11	KES,MF,1/8W,1%,61.4	KN550-61R9F	TKW	4701-03-6149	1
R06 R12	KES,MF,1/8W,1%,825	KN550-8250F	TKW	4701-03-8250	2
R1 R10 R2 R9	KES,MF,1/4W,1%,190	KN600-1960F	TKW	4701-13-1960	4
R8	KES,MF,1/4W,1%,71.5	KN600-71R5F	TKW	4701-13-7159	1
13	SWITCH ASSY ROTARY	136-SW1E	WVTR	5104-00-0016	1
<b>WAVETEK</b> PARTS LIST		TITLE ATTEN SW ASSY  ASSEMBLY NO. 1202-00-0008  PAGE: 1			REV B

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	<b>WAVETEK</b> SAN DIEGO • CALIFORNIA  TITLE OUTPUT ATTEN SW ASSY		
MATERIAL	PROJ ENGR				
	RELEASE	APPROV			
	TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° .XX ±.030				
FINISH WAVETEK PROCESS	DO NOT SCALE DWG		MODEL NO.	DWG NO.	REV
	SCALE		132	1202-00-0008	B
			CODE IDENT 23338	SHEET 1 OF 3	



NOTES: UNLESS OTHERWISE SPECIFIED  
 1) NUMBERS INDICATE TERMINATION POINT

B	ECN 321	S	1/17	S
A	ECN 321	N	6	1/17

TOLERANCE UNLESS OTHERWISE SPECIFIED	REL.	ECN	BY	DATE	APP
XXX .010					
XX .020					
ANALYST 0.30					

SCALE	N/A	DATE	5-20	APP	K.S.
-------	-----	------	------	-----	------

MATERIAL	TITLE
N/A	ASSEMBLY ATTENUATOR 942

FINISH	MODEL NO.	DWG NO.
N/A	142/44	1203-00-0008

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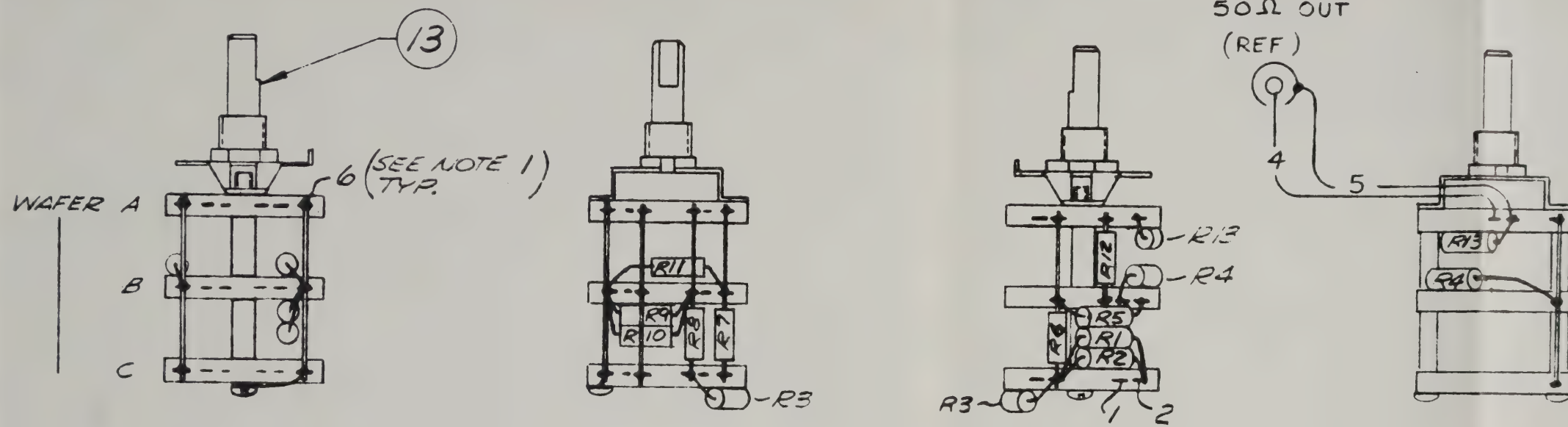


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REFERENCE DESIGNATORS	PART DESCRIPTION	UNIG-PFGN-PART-NO	MFUP	WAVETEK NO.	QTY/PT
H7	RES,MF,1/8W,1%,209	RN55U-2440F	TNN	4701-03-2499	1
H3	RES,MF,1/8W,1%,27.4	RN55U-27H4F	TNY	4701-03-2744	1
H4	RES,MF,1/8W,1%,54.4	RN55U-54H9F	TNI	4701-03-5499	1
H13 H5	RES,MF,1/8W,1%,59	RN55U-54H0F	TNN	4701-03-5409	2
H11	RES,MF,1/8W,1%,61.4	RN55U-61H9F	TNN	4701-03-6199	1
R06 H12	RES,MF,1/8W,1%,825	RN55U-8250F	TNT	4701-03-8250	2
H1 H10 R2 H9	RES,MF,1/4W,1%,140	RN60U-1460F	TNN	4701-13-1460	4
H8	RES,MF,1/4W,1%,71.5	RN60U-71H5F	TNN	4701-13-7159	1
13	SWITCH ASSY KUTARY	136-SW1b	WVTA	5104-00-001b	1
WAVETEK PARTS LIST		TITLE ATTN SW ASSY		ASSEMBLY NO. 1202-00-000b  PAGE: 1	REV d

NOTE: UNLESS OTHERWISE SPECIFIED

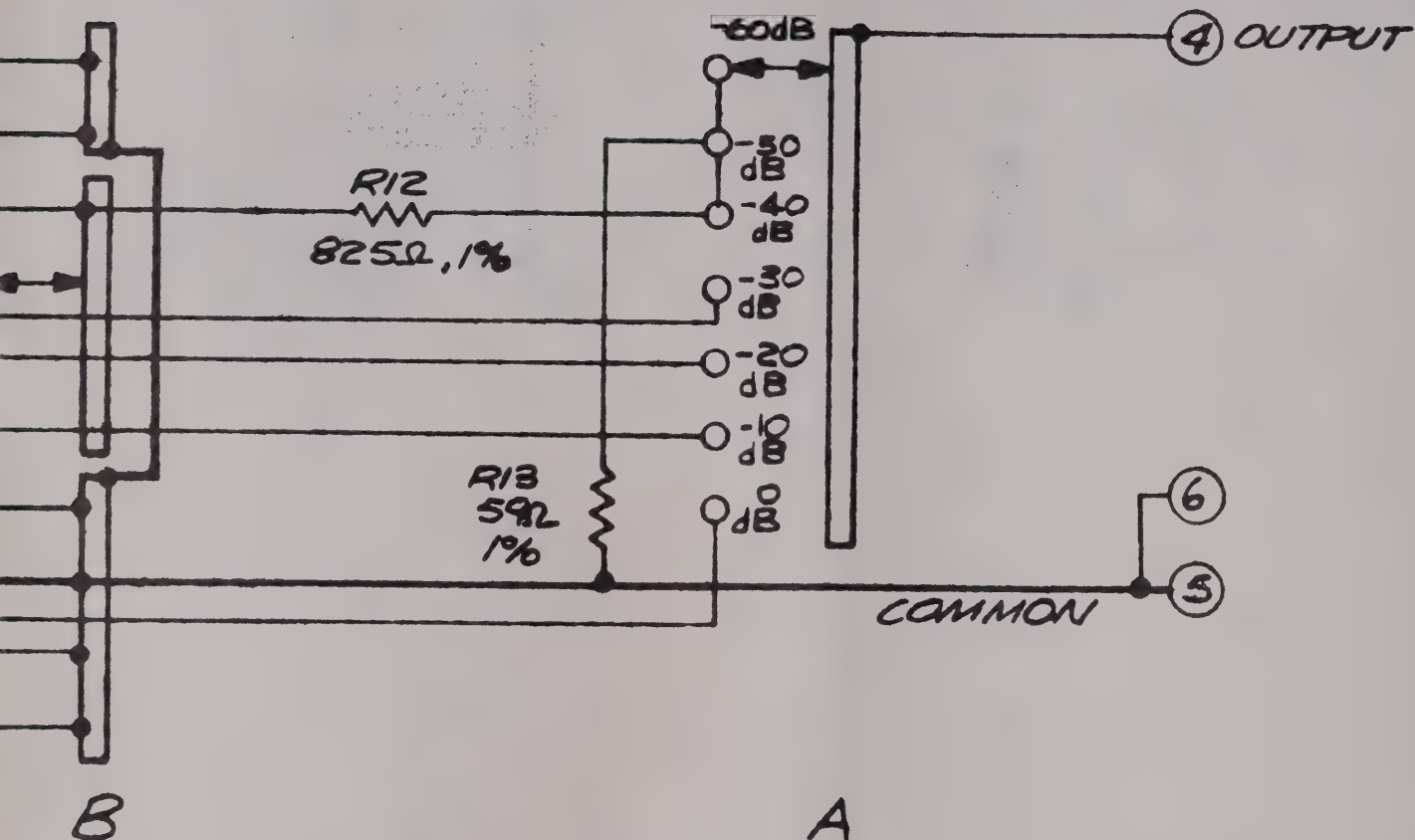
REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	WAVETEK SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ/ENGR		TITLE OUTPUT ATTN SW ASSY	
FINISH WAVETEK PROCESS	RELEASE APPROV			
	TOLERANCE UNLESS OTHERWISE SPECIFIED			
	XXX : 010      ANGLES : 1° XX : 030			
	DO NOT SCALE DWG	MODEL NO	DWG NO	REV
SCALE	132	1202-00-000b	B	
	CODE IDENT	23338	SHEET 1 OF 3	



NOTES: UNLESS OTHERWISE SPECIFIED

1) NUMBERS INDICATE WIRE TERMINATION POINTS.

B	LEN	2	1/2	5
A	ECN	321	N	6
REL	REV	BY	DATE	APP
WAVETEK SAN QING CHEN				
SCALE	N/A	DATE	5-20	APP
MATERIAL	N/A	ASSEMBLY ATTENUATOR 54.2		
FINISH	N/A	14244 1202-00-0008 8		
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B	UPDATE TO	BJ	1%
A	ECN 321	1%	1%
REV	ICR	BY	DATE
WAVETEK SAN DIEGO, CALIF			
SCALE	BY	DATE	MR. J. J.
MATERIAL	TITLE		
SCHEMATIC			
ATTENUATOR			
MODEL NO.	DATE	SN	3 OF 3
100-1202-00-0008			
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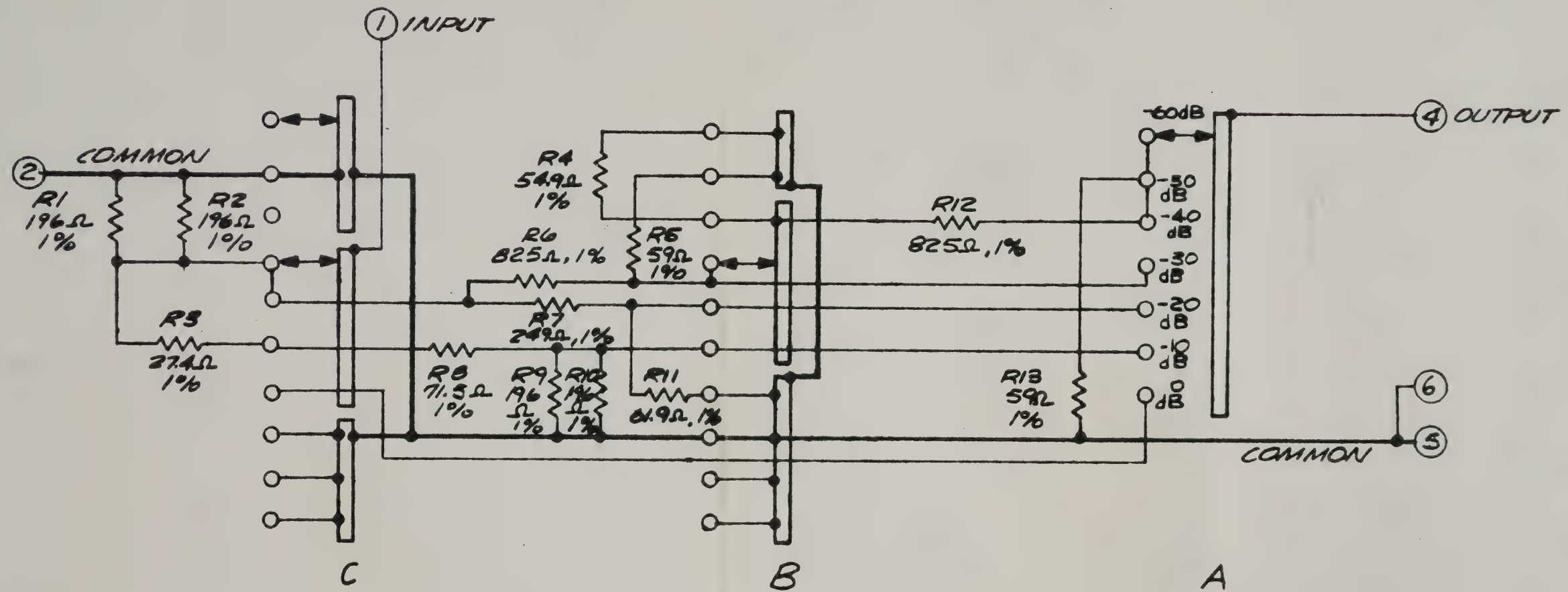
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REV	ECN	BY	DATE	APP
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DESCRIPTION	ORIG-MFGN-PART-NO	MFGN	WAVETEK NO.	QTY/PT
1/8W, 1%, 10	RN55D-10K0F	TNN	4701-03-1009	1
1/8W, 1%, 215	RN55D-2150F	TNN	4701-03-2150	2
1/8W, 1%, 21.5	RN55D-21R5F	TNN	4701-03-2159	1
1/8W, 1%, 681	RN55D-6810F	TNN	4701-03-6810	2
1/8W, 1%, 68.1	RN55D-68R1F	TNN	4701-03-6814	2
ASSY ROTARY	132-SW2	HVTK	5104-00-0014	1
STOP	212-33-006	CTS	5104-07-0002	1
ASSEMBLY NO. 1202-00-0003  PAGE: 1				REV

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	<b>WAVETEK</b> SAN DIEGO • CALIFORNIA TITLE S/N - N/S ATTEN SW ASSY	
MATERIAL	PROJ ENGR			
	RELEASE APPROV			
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° .XX ±.030 DO NOT SCALE DWG			
	SCALE	MODEL NO. 132	DWG NO. 1202-00-0003	REV
		CODE IDENT 23338	SHEET 1 OF 3	



NOTES: UNLESS OTHERWISE SPECIFIED  
 1. CIRCLED NUMBERS, I.E. ① ETC, INDICATE WIRING INTERCONNECTIONS.

B	UNLESS TO COMPUTER	BY	DATE	APP
A	ECN 321	BY	DATE	APP
TOLERANCE LIMITS OTHERWISE SPEC				
XX 010				
XX 030				
XX 050				
XX 070				
XX 090				
XX 110				
XX 130				
XX 150				
XX 170				
XX 190				
XX 210				
XX 230				
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XX 270				
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XX 4000				

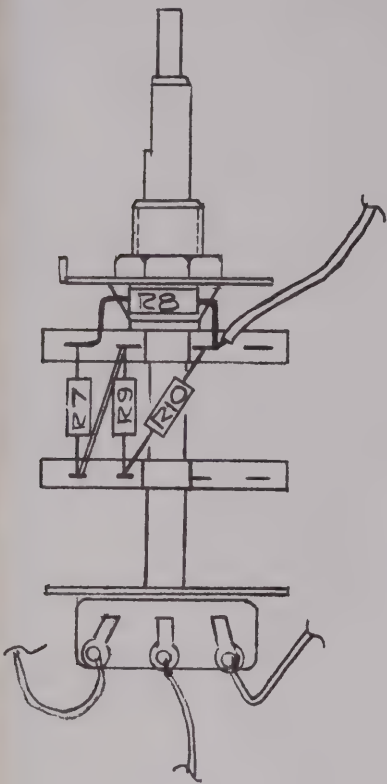
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REFERENCE DESIGNATIONS	PART DESCRIPTION	QML#-MFG#-PART-NO	MFG#	WAVETEK NO.	QTY/PK
R8	RES,MF,1/8W,1%,10	KN55D-10K0F	THN	4701-03-1009	1
R3 R9	RES,MF,1/8W,1%,215	KN55D-2150F	THN	4701-03-2150	2
R6	RES,MF,1/8W,1%,21.5	KN55D-21R5F	THN	4701-03-2159	1
K2 R7	RES,MF,1/8W,1%,681	KN55D-6810F	THN	4701-03-6810	2
R05 R10	RES,MF,1/8W,1%,68.1	KN55D-68R1F	THN	4701-03-6814	2
1	SWITCH ASSY ROTARY	132-SWg	WVTK	5104-00-0014	1
3	SWITCH STOP	212-33-006	CTB	5104-07-0002	1
WAVETEK PARTS LIST		TITLE ATTEN SW ASSY		ASSEMBLY NO. 1202-00-0003  PAGE: 1	
				REV	

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES		DATE	WAVE TEK SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ ENGR		TITLE S/N - N/S ATTEN SW ASSY	
	RELEASE - APPROV			
FINISH WAVE TEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED XXX : 010 ANGLES : 1° XX : 020		MODEL NO	DWG NO
	DO NOT SCALE DWG		132	1202-00-0003
	SCALE		CODE IDENT 23338	REV SHEET 1 OF 3





N/A	B. REEDMAN 2-2-72 R.C.
N/A	SWITCH ASSY, S/N ATTN
N/A	132 1202-00-0003

-60dB O  
 -50dB O  
 -40dB O  
 -30dB O  
 -20dB O  
 -10dB O  
 0dB O  
 ⑦

D

-60dB O  
 -50dB O  
 -40dB O  
 -30dB O  
 -20dB O  
 -10dB O  
 0dB O

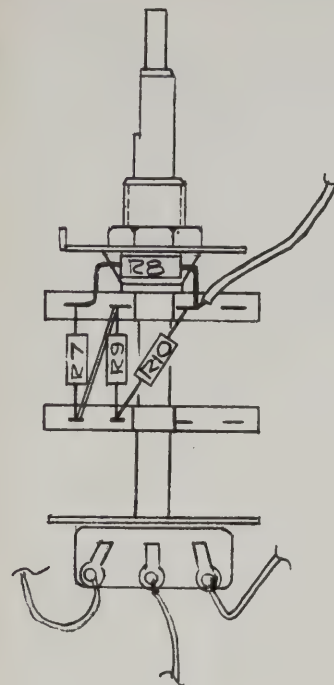
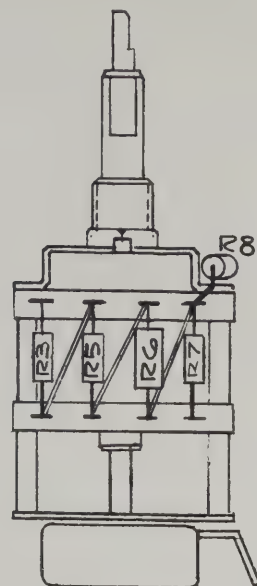
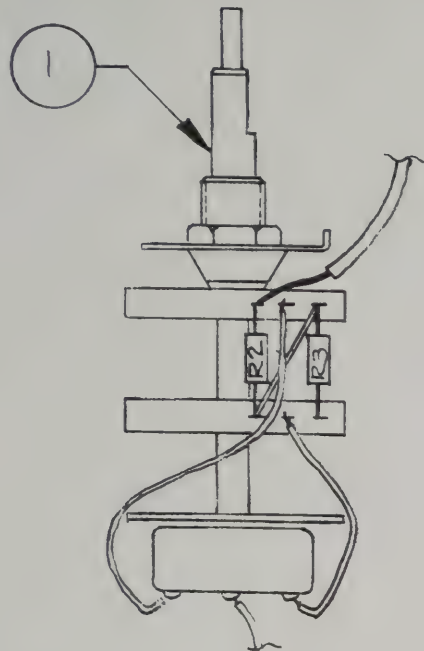
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NOTES: UNLESS OTHERWISE SPECIFIED

1. CIRCLED NUMBERS, I.E. ① ETC, INDICATE WIRING INTERCONNECTIONS.

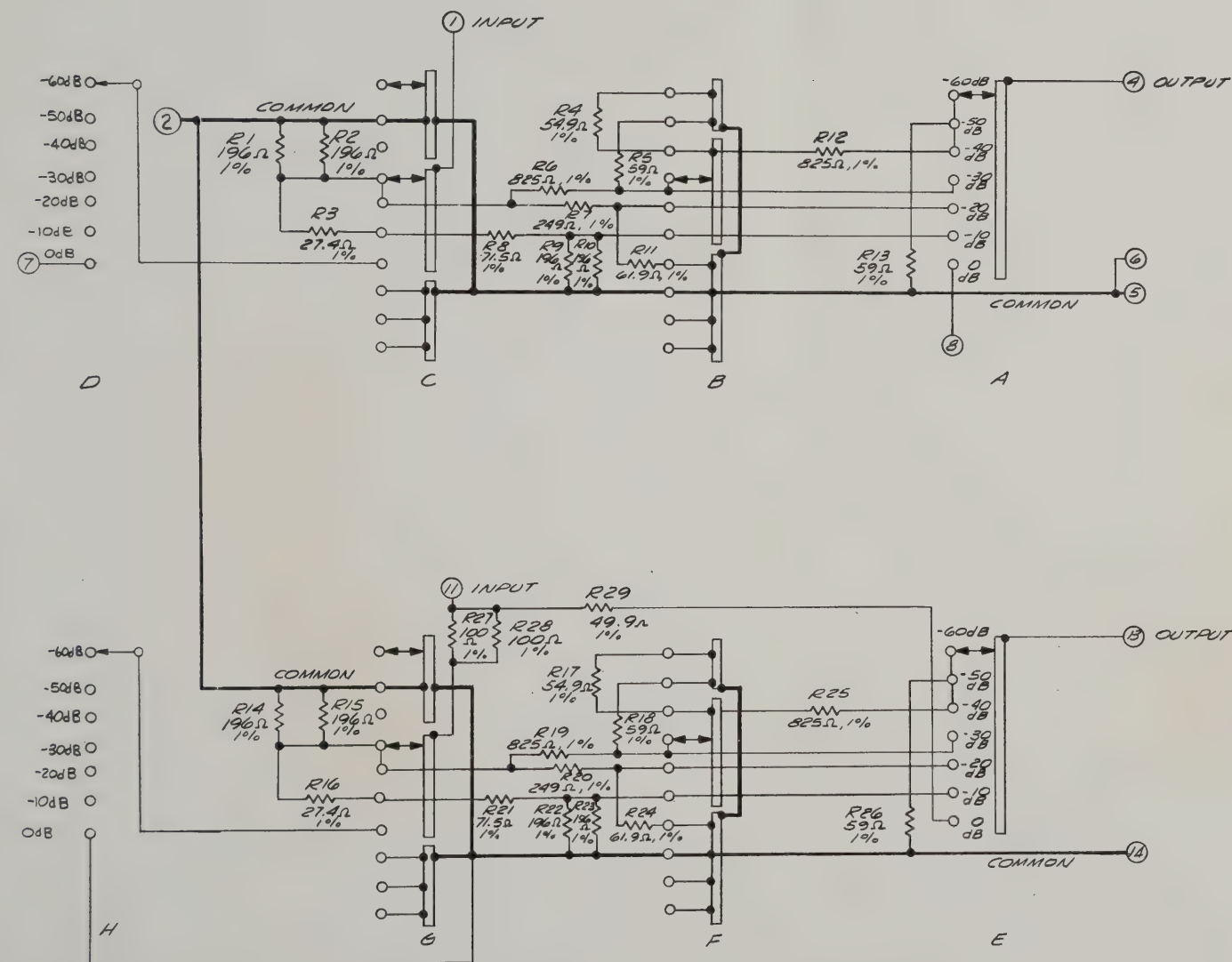
2. SEE SCHEMATIC 131A-200

WAVEFORM	
N/A	GRAY 2-12-71 JHP
N/A	SCHEMATIC ATTENUATOR
N/A	131A 1202-00-0003



N/A	B. REEMAN 2-2-72 R.C.
N/A	SWITCH ASSY, S/N ATTN
N/A	132 1202-00-0003





NOTES: UNLESS OTHERWISE SPECIFIED

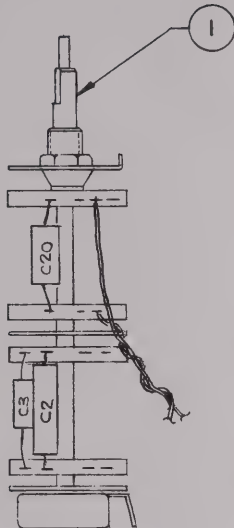
1. CIRCLED NUMBERS, I.E. ① ETC, INDICATE WIRING INTERCONNECTIONS.

2. SEE SCHEMATIC 131A-200

N/A	GRAY	2-12-71	JAP		
N/A					
N/A	131A	1202-00-0003			

REFERENCE DESIGNATORS	PART DESCRIPTION	UNIG-MFGN-PART-NO	MFR	WAVETEK NO.	QTY/PT
NONE	SCHEMATIC, LOGIC	0103-00-0041	WVTR	0103-00-0041	1
C5	CAP, MICA, 15PF, 500V	DM15-150J	AMCO	1500-11-5000	1
C23	CAP, MICA, 220PF, 500V	DM15-221J	AMCO	1500-12-2100	1
C19	CAP, MICA, 56PF, 500V	DM15-560J	AMCO	1500-15-6000	1
C18	CAP, MICA, 560PF, 500V	DM15-561J	AMCO	1500-15-6100	1
C4	CAP, MICA, 410PF, 500V	DM15-911F	AMCO	1500-19-1101	1
C3	CAP, POLY, .01MF, 100V	PA25103F	IMB	1500-41-0304	1
C2	CAP, POLY, .1MF, 100V	PA25104F	IMB	1500-41-0404	1
C22	POLY, .0022MF, 200V	192P22292	SPRAG	1500-42-2204	1
C21	POLY, .022MF, 200V	192P22392	SPRAG	1500-42-2304	1
C20	CAP, POLY, .22MF, 80V	192P2249H8	SPRAG	1500-42-2403	1
C17	POLY, .0056MF, 200V	192P56242	SPRAG	1500-45-6204	1
C16	POLY, .056MF, 200V	192P56392	SPRAG	1500-45-6304	1
1	SWITCH ASSY ROTARY	132-SR3	WVTR	5104-00-0015	1
3	SWITCH STOP	212-33-006	CFS	5104-07-0002	1
<b>WAVETEK</b> PARTS LIST		TITLE FREQ SW ASSY		ASSEMBLY NO. 1202-00-0004 PAGE 1	
				REV B	

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	<b>WAVETEK</b> SAN DIEGO • CALIFORNIA TITLE FREQ SW ASSY	
MATERIAL	PROJ ENGR			
	RELEASE APPROV		MODEL NO. 132 DWG NO. 1202-00-0004 REV B	
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX : .010 ANGLES : 1° .XX : .030			
	DO NOT SCALE DWG			
	SCALE			
	CODE IDENT	23338	SHEET OF	



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

TOLERANCE UNLESS OTHERWISE SPEC		S		ECN 15-B		RO 5-37	
.XXX ± .010		A		#405		BR 1-2-72	
.XX ± .030		REV		ECN		BY	
ANGLES ± 0°30'		DATE		DATE		APP	
SCALE N/A		BY B. REDMAN		DATE 2-2-72		APP R. C.	
MATERIAL N/A		TITLE					
		SWITCH ASSY, FREQ. RG					
FINISH N/A		MODEL NO. 132		DWG NO. 1202-00-000-1		REV 1	
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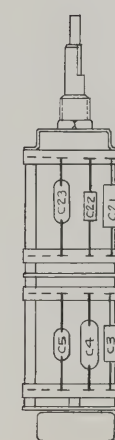
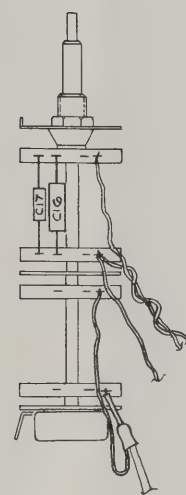
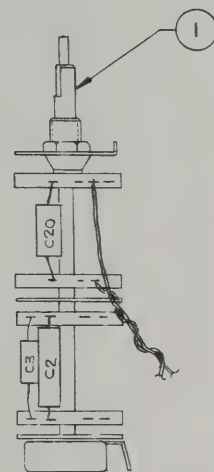
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REV	ECN	BY	DATE	APP
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REFERENCE DESIGNATORS	PART DESCRIPTION	UNIG-MFGN-PART-NO	MFR	WAVETEK NO.	QTY/PT
NONE	SCHEMATIC, LOGIC	0103-00-0041	WVTA	0103-00-0041	1
C5	CAP, MICA, 15PF, 500V	DM15-150J	AWCO	1500-11-5000	1
C23	CAP, MICA, 220PF, 500V	DM15-221J	AWCO	1500-12-2100	1
C19	CAP, MICA, 56PF, 500V	DM15-560J	AWCO	1500-15-6000	1
C18	CAP, MICA, 560PF, 500V	DM15-561J	AWCO	1500-15-6100	1
C4	CAP, MICA, 910PF, 500V	DM15-911F	AWCO	1500-19-1101	1
C3	CAP, POLY, .01MF, 100V	PA26103F	IMB	1500-41-0304	1
C2	CAP, POLY, .1MF, 100V	PA26104F	IMB	1500-41-0404	1
C22	POLY, .0022MF, 200V	192P22292	SPHAG	1500-42-2204	1
C21	POLY, .022MF, 200V	192P22392	SPHAG	1500-42-2304	1
C20	CAP, POLY, .22MF, 80V	192P2249H8	SPHAG	1500-42-2403	1
C17	POLY, .0056MF, 200V	192P56292	SPHAG	1500-45-6204	1
C16	POLY, .056MF, 200V	192P56392	SPHAG	1500-45-6304	1
1	SWITCH ASSY ROTARY	132-S43	WVTA	5104-00-0015	1
3	SWITCH STOP	212-33-006	CIS	5104-07-0002	1
WAVETEK PARTS LIST		TITLE FREQ SW ASSY		ASSEMBLY NO. 1202-00-0004 PAGE: 1	REV B

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES	DRAWN	DATE	WAVETEK SAN DIEGO • CALIFORNIA	
MATERIAL	PROJ ENGR		TITLE	
	RELEASE APPROV		FREQ SW ASSY	
FINISH WAVETEK PROCESS	TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ± .010 XX ± .030		MODEL NO	REV
	DO NOT SCALE DWG		132	B
	SCALE		DWG NO	
	CODE IDENT		23338	SHEET OF

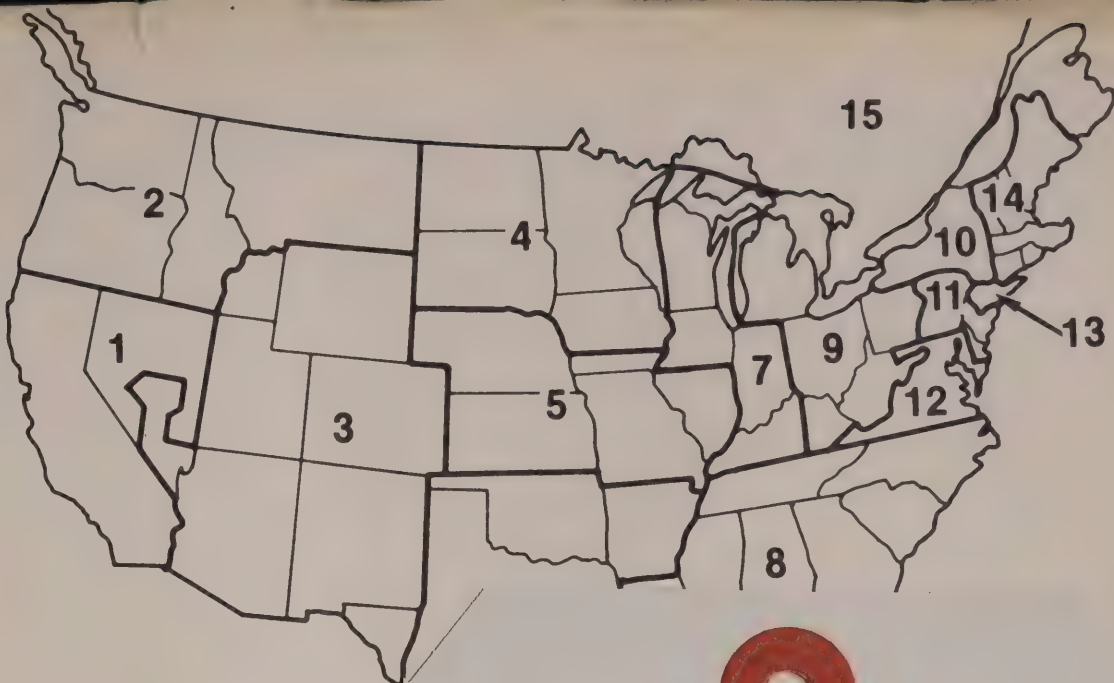


REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

S		ECN 15-B		RO 5-37	
A		#425		BR 12-76	
REV	ECN	BY	DATE	APP	
<b>WAVETEK</b> SAN DIEGO, CALIFORNIA					
SCALE	N/A	BY	B. REDMAN	DATE	2-2-72
MATERIAL	N/A	APP	K. G.		
TITLE					
SWITCH ASSY, FREQ RG					
MODEL NO.	132	DWG NO.	1202-00-000-1	REV	B
FINISH	N/A	THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND DESIGN RIGHTS BELONGING TO WAVETEK AND MAY NOT BE REPRODUCED FOR ANY REASON EXCEPT CALIBRATION, OPERATION AND MAINTENANCE WITHOUT WRITTEN AUTHORIZATION			







16



## Representatives

### 1 WARD/DAVIS ASSOCIATES

Redondo Beach, CA 90278  
Telephone: 213/973-7772  
Santa Clara, CA 95051  
Telephone: 408/245-3700  
San Diego, CA 92111  
Telephone: 714/292-1000

### 2 PACIFIC NW ELECTRONICS

Bellevue, WA 98004  
Telephone: 206/454-0150  
Portland, OR 97223  
Telephone: 503/684-1870

### 3 BFA CORPORATION

Albuquerque, NM 87112  
Telephone: 505/292-1212  
Denver, CO 80210  
Telephone: 303/777-8070  
Colorado Springs, CO 80907  
Telephone: 303/594-0880  
Scottsdale, AZ 85251  
Telephone: 602/994-5400  
Las Cruces, NM 88004  
Telephone: 505/524-9693  
Salt Lake City, UT 84115  
Telephone: 801/466-6522  
El Paso, TX 79912  
Telephone: 915/542-1762

### DYTEC/NORTH, INC.

St. Paul, MN 55104  
Telephone: 612/645-5816

### DYTEC/SOUTH, INC.

Maryland Hts., MO 63043  
Telephone: 314/569-2990  
Lenexa, KS 66214  
Telephone: 913/888-0215

## YOUR SERVICE REQUIREMENTS

☐ REPAIR/CALIBRATION

☐ CAL

☐ CAL

☐ CAL

☐ SOU

☐ OTH

☐ COM

☐ INT

**WAVETEK**  
**SAN DIEGO**

Symptom

Test equipment used to verify failure

**WAVETEK**  
SAN DIEGO



WAVETEK and its employees  
have taken great pride in the  
designing and manufacturing  
of this instrument to ensure  
you the finest instrument pos-  
sible.

132

MODEL

6520055

SERIAL NUMBER

378

ASSEMBLER



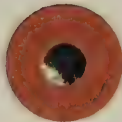
QUALITY ASSURANCE

CALIBRATION

FINAL INSPECTOR







## YOUR SERVICE REQUIREMENTS

- ☐ REPAIR/CALIBRATION
- ☐ CALIBRATION STICKER
- ☐ CALIBRATION TRACEABILITY
- ☐ CERTIFICATE OF COMPLIANCE
- ☐ SOURCE INSPECTION
- ☐ OTHER \_\_\_\_\_

### FAILURE SYMPTOMS

- |                                       |                                    |
|---------------------------------------|------------------------------------|
| <input type="checkbox"/> CONSTANT     | SENSITIVE TO:                      |
| <input type="checkbox"/> INTERMITTENT | <input type="checkbox"/> COLD      |
|                                       | <input type="checkbox"/> HEAT      |
|                                       | <input type="checkbox"/> VIBRATION |

Symptoms Noted \_\_\_\_\_

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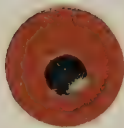
Test equipment used to verify failure

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# WAVETEK®

SAN DIEGO

9045 Balboa Ave., San Diego, CA 92123  
P. O. Box 651, San Diego, Calif. 92112  
Tel 714/279-2200 TWX 910-335-2007

Should you need service, Wavetek has facilities to provide you with most service requirements if your instrument should malfunction. Highly trained individuals can assist you with any technical problems and if necessary, direct you to return the instrument for service. To eliminate many delays caused by lack of communication, please fill out this label and attach it to your instrument.

---

COMPANY

---

ADDRESS

---

NAME

---

PHONE NO.

EXT.

---

MODEL NO.

SERIAL NO.

---

P.O. NO.

DATE

Accessories returned with the unit

- ☐ None
- ☐ Power Cable(s)
- ☐ Manual
- ☐ Other \_\_\_\_\_





## Representatives

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Telephone: 303/594-0880  
Scottsdale, AZ 85251  
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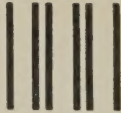
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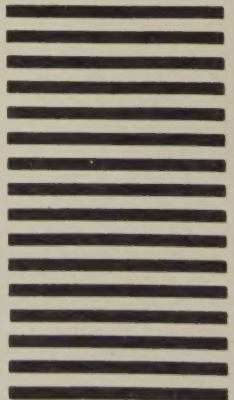
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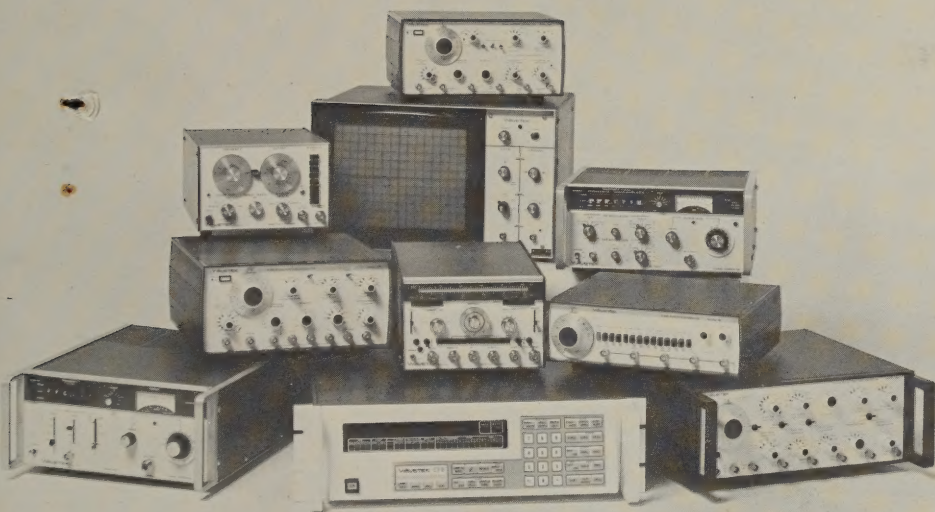


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